# M E E T I N G  N O T I C E  AND  A G E N D A

## *TECHNICAL ADVISORY COMMITTEE OF THE SEASIDE BASIN WATER MASTER*

**DATE: Wednesday, January 8, 2014**
**MEETING TIME: 1:30 p.m.**
**Monterey Regional Water Pollution Control Agency Offices**
**5 Harris Court, Building D (Ryan Ranch)**
**Monterey, CA 93940**

***If you wish to participate in the meeting from a remote location, please call in on the Watermaster Conference Line by dialing (877)810-9415. Use the Access Code of 4560043. Please note that if no telephone attendees have joined the meeting by 10 minutes after its start, the conference call will be ended.***

**OFFICERS**
**Chairperson: Eric Sabolsice, California American Water Company**
**Vice-Chairperson: Rob Johnson, MCWRA**

**MEMBERS**

**California American Water Company** | **City of Del Rey Oaks** | **City of Monterey**
**City of Sand City** | **City of Seaside** | **Coastal Subarea Landowners**
**Laguna Seca Property Owners** | **Monterey County Water Resources Agency**
**Monterey Peninsula Water Management District**

## *SEASIDE BASIN WATER MASTER*
## *TECHNICAL ADVISORY COMMITTEE*

### ** * * AGENDA TRANSMITTAL FORM * * **

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| **MEETING DATE:** | January 8, 2014 |
| **AGENDA ITEM:** | 2.A |
| **AGENDA TITLE:** | Approve Minutes from the November 13, 2013 Meeting |
| **PREPARED BY:** | Robert Jaques, Technical Program Manager |

**SUMMARY:**
Draft Minutes from this meeting were emailed to all TAC members. Any changes requested by TAC members have been included in the attached version.

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| **ATTACHMENTS:** | Minutes from this meeting |
| **RECOMMENDED ACTION:** | Approve the minutes |

**D-R-A-F-T**
**MINUTES**

**Seaside Groundwater Basin Watermaster**
**Technical Advisory Committee Meeting**
**November 13, 2013**

**Attendees: TAC Members**

City of Seaside – Rick Riedl
California American Water – Roger Hulbert
City of Monterey – Norm Green
Laguna Seca Property Owners – Bob Costa
MPWMD – Jon Lear
MCWRA – No Representative
City of Del Rey Oaks – Leon Gomez
City of Sand City – Leon Gomez
Coastal Subarea Landowners – No Representative

**Watermaster**
Technical Program Manager - Robert Jaques

**Consultants**
HydroMetrics - Derrik Williams

**Others**
Leonard McIntosh

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The meeting was called to order at 1:40 p.m., once a quorum was present.

**1. Public Comments**

There were no public comments.

**2. Administrative Matters:**

**A. Approve Minutes from the September 11, 2013 Meeting**

On a motion by Mr. Gomez, seconded by Mr. Costa, the minutes of the September 11, 2013 meeting were unanimously approved as presented.

**B. Update on Storm Water Issues**

Mr. Jaques summarized the materials on this agenda item. There were no questions.

**D. Approve Initial RFSs for MPWMD and HydroMetrics for 2014**

Mr. Jaques summarized the agenda packet materials for this item. Mr. Lear pointed out a correction that needed to be made to the description of the scope of work for MPWMD RFS 2014-01, in section I.2.b.3 regarding barium and iodine sampling. He will send Mr. Jaques a language revision to correct this statement. He reported it would have no cost impact because the work had been properly included in the cost estimate. On a motion by Mr. Costa, seconded by Mr. Gomez, all four of the RFSs were unanimously approved.

**E. Update on HydroMetrics Modeling of Laguna Seca Subarea**

Mr. Jaques summarized the agenda packet materials for this item. Mr. Williams made a PowerPoint presentation to provide a status update on the Laguna Seca subarea modeling work.

Mr. Jaques asked Mr. Williams what would require there to be a "subsurface water outflow" from the Laguna Seca subarea. Mr. Williams responded that there actually is not a specific "requirement" for this. He reported that in discussions with MPWMD staff it was learned that creek flows (to the Arroyo Del Rey) are not influenced by groundwater levels because the groundwater levels are too low.

HydroMetrics tried to maintain outflow at current levels as estimated by the model. If the subsurface outflow were reduced, the 240 acre feet per year Natural Safe Yield would increase. .

Mr. Williams explained some reasons for the change in Natural Safe Yield from the amount established in the Decision. He said there is a large annual variation due to rainfall variations from year to year. He went on to describe the terms Natural Safe Yield and Operational Safe Yield.

The westerly wells (for example F0-4 and R-7) are less affected i.e. groundwater levels do not go down as much, but the eastern wells (for example F- 06) are very much affected.

Even if all Standard Producers stopped pumping, and Alternate Producers reduced pumping by 50 percent, well water levels would continue dropping in some wells. There is some improvement but that is mainly only in the west.

If all Standard and Alternate Producer pumping was halted (except for about eight acre feet per year of small private pumping that is not covered by the Decision) it is still not possible to achieve Operational Safe Yield conditions. There are numerous wells just outside the south easterly Basin boundary that affect groundwater levels in the Laguna Seca subarea.

Mr. Jaques asked Mr. Williams what caused the boundary to be drawn where it was when the Decision was prepared. Mr. Williams said he did not know the reason, but understood that it was based on a study done some years prior to the issuance of the Decision. Mr. Lear clarified that the boundary was taken from a 1980 U. S. G. S. report that was based on 1977 data.

Pumping outside of the Laguna Seca subarea is about twice the amount being pumped in the Laguna Seca subarea.

Mr. Riedl inquired about the request made by the Wang subdivision proponents to the Watermaster about a year ago to get the Watermaster's approval to put in wells along Highway 68 in this immediate vicinity. Mr. Lear responded that the Wang subdivision geohydrologist had provided a report at that time indicating that these wells would not have an impact on the Seaside Groundwater Basin. Mr. Lear went on to say, however, that since then the MPWMD has obtained information suggesting that these wells could impact the Seaside Groundwater Basin.

Mr. Jaques asked Mr. Williams why pumping outside the Basin drops in the future as shown on Slide No. 11 of the PowerPoint presentation. Mr. Williams said he did not know but would look into this.

Mr. Costa asked Mr. Williams if the model could be used to estimate the impact of reducing the outside-Basin pumping and Mr. Williams responded that it could.

Outflow to the Coastal and Northern Inland subareas would change very little if pumping was turned off in the Laguna Seca subarea.

Mr. Williams said that groundwater levels will continue to drop in the east if all pumping is turned off, but overall the Laguna Seca subarea would be almost in balance because the westerly well water levels would rise somewhat.

Mr. Williams reiterated that under the standard definitions of Natural Safe Yield and Operational Safe Yield, neither of these can be achieved even with the extreme measures of discontinuing all pumping from the Laguna Seca subarea.

A number of modeling scenarios could be run, but they would largely be infeasible and unrealistic.

Mr. Williams said that with the current outside-Basin pumping continuing at current rates, groundwater levels in the easterly portion of the Laguna Seca subarea will continue to drop even with all Laguna Seca subarea pumping stopped.

Mr. Costa asked Mr. Williams about modeling he was familiar with in other basins, and wondered if it was common practice to include all wells that impact a basin as being located within the basin's boundaries. Mr. Williams said this model is somewhat unique in that it includes the impact of wells outside the Basin. He went on to say that other models typically don't account for wells outside the basin, but maintain a static (current) amount of outflow or inflow across the basin boundary.

Mr. Williams asked if there was a need to answer these questions at this time, and wondered if CAW would change its plans for its Laguna Seca subarea operations depending on the results of this work. Mr. Hulbert said he was not sure but would discuss this with Mr. Sabolsice.

Mr. Lear suggested that finding out when dropping groundwater levels will eventually impact Alternate Producers would be a good question to answer. Mr. Williams noted that there may be a policy issue that needs to be raised with the Court as a result of the information thus far from this modeling work.

Mr. Hulbert said that CAW plans to service its Laguna Seca subarea customers from its Main System in the future, but would like to keep its Laguna Seca subarea wells operational to provide redundancy. Mr. Lear noted that CAW could consider extending its Main System service to its Toro and Ambler Park well customers. Mr. Lear noted that CAW's Bay Ridge well is outside the Basin but was actually included in the Decision.

Mr. Williams suggested identifying refined questions to try to answer with the model. Mr. Lear said he would like to see the timeline regarding when Alternate Producers would experience "material injury". Mr. Williams said that is within the current scope of work. Mr. Hulbert recommended the TAC evaluate what can be answered with the current model results, and what, if any, additional modeling might be desirable.

A motion was made by Mr. Lear, seconded by Mr. Hulbert to have HydroMetrics finish its currently authorized scope of work and come to the January 8, 2014 TAC meeting to make a further presentation on the results.

**F. Discuss and Provide Input on the 2013 Seawater Intrusion Analysis Report (SIAR)**

Mr. Jaques introduced the topic and Mr. Williams made a PowerPoint presentation on the Seawater Intrusion Analysis Report (SIAR).

Mr. Williams reported that very little change had occurred from prior SIAR findings, and that there were no indications of seawater intrusion. He described how Piper and Stiff diagrams are used in the SIAR. Only one Santa Margarita Sentinel well has a chloride level > 250 ppm (SBWM MW-4) and it had a level higher than 250 ppm previously, so it continues to be sampled twice per year. The changing chloride levels at PCA West Deep starting in 2009 were found to be due to the change in sampling technique that occurred then.

Mr. Williams reported that groundwater levels continue to drop, noting that it was a dry year and there was therefore heavy pumping.

On a basinwide basis, groundwater production overall is well below the Decision-allowed pumping levels.

Mr. Jaques asked Mr. Lear if he would please get the Sand City Public Works Well report to him soon so it can be included in the Annual Report. Mr. Lear said he would notify Mr. Oliver of this.

Mr. Riedl asked Mr. Williams some questions and answers were provided with regard to that well. Mr. Lear said that the Sand City desalination plant intake well may be impacting the Public Works well. It was noted that the Sand City Public Works Well now has a chloride level of 261 ppm which is above the Drinking Water Regulation secondary standard of 250 ppm.

A motion was made by Mr. Green, second by Mr. Gomez, to approve the SIAR and to forward it to the Board for their consideration of approval.

**G. Discuss and Provide Input on the Preliminary Draft Watermaster 2013 Annual Report**

Mr. Jaques briefly described the purpose of the Annual Report and highlighted some specific issues and then invited questions. There were no questions.

On a motion by Mr. Costa, seconded by Mr. Hulbert, the TAC unanimously approved the Preliminary Draft Annual Report, and when the missing items in the Preliminary Draft are included, recommended that it become the Draft Annual Report for the Board to consider approving.

**H. Further Discussion of Geophysical Imaging of Saltwater Intrusion**

Mr. Jaques summarized the agenda packet materials on this item. There was consensus to keep the topic open for further discussion with the researchers when they have more information to provide.

**I. Schedule**

Mr. Jaques summarized the agenda packet materials for this item. There were no questions or discussion.

**J. Other Business**

Mr. Hulbert said that he will be periodically serving as Mr. Sabolsice's alternate, and asked if he needed a formal authorization submitted to the Watermaster for this purpose. Mr. Jaques responded that simply having Mr. Sabolsice send an e-mail to formalize this to Mr. Jaques would suffice.

**K. Set Next Meeting Date**

A motion was made by Mr. Riedl, seconded by Mr. Lear, to set the next meeting for Wednesday January 8, 2014. There will be no December 2013 TAC meeting.

The meeting adjourned at 3:28 p.m.

## *SEASIDE BASIN WATER MASTER*
## *TECHNICAL ADVISORY COMMITTEE*

### ** * * AGENDA TRANSMITTAL FORM * * **

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| **MEETING DATE:** | January 8, 2014 |
| **AGENDA ITEM:** | 2.B |
| **AGENDA TITLE:** | Update on Storm Water Issues |
| **PREPARED BY:** | Robert Jaques, Technical Program Manager |

**SUMMARY:**

A meeting of the MRWPCA TAC was held by on October 24, 2013 to discuss groundwater recharge and the role that storm and non-storm water flows might be able to play in this. This was in concert with discussions recently held by the MPRWA TAC on some of these same topics.

In the November Watermaster TAC agenda the agenda packet from that meeting, as well as meeting notes, were provided. As reported in those documents, the MRWPCA TAC voted to recommend that the MRWPCA Board undertake a large-scale study to identify opportunities and constraints to reusing stormwater, and to partner with MPWMD and MCWRA in performing such a study.

At the November 25, 2013 MRWPCA Board meeting the Board unanimously voted to authorize the General manager to solicit various entities to join and support the Northern Monterey County Regional Water Planning Study. MRWPCA envisions that this study will investigate all of the potential water opportunities within the Northern Monterey County area, assess water sources and supplies, and discuss opportunities for entities to work together to develop these water resources for beneficial use. MRWPCA is currently working on the letter to solicit the various entities to join.

I have invited Jim Cullem, Executive Officer of the Monterey Peninsula Regional Water Authority (MPRWA) to join us to today to provide a brief oral report on what the MPRWA is doing with regard to storm water as a potential source of water for replenishing the Seaside Groundwater Basin.

I recommend that I participate on behalf of the Watermaster in any working groups or other study-related activities that MRWPCA and MPRWA may set up for this study, so we will remain closely informed and involved, as appropriate, and so I can keep the TAC up-to-date on these matters.

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| **ATTACHMENTS:** | None |
| **RECOMMENDED ACTION:** | Concur with the Technical Program Manager's participation in MRWPCA's storm water study, as described above |

## *SEASIDE BASIN WATER MASTER*
## *TECHNICAL ADVISORY COMMITTEE*

### ** * * AGENDA TRANSMITTAL FORM * * **

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| **MEETING DATE:** | January 8, 2014 |
| **AGENDA ITEM:** | 2.C |
| **AGENDA TITLE:** | Update on Seaside Basin Salt and Nutrient Management Plan |
| **PREPARED BY:** | Robert Jaques, Technical Program Manager |

**SUMMARY:**

HydroMetrics is coming to the completion of the Seaside Basin Salt and Nutrient Management Plan, which they are preparing for MPWMD, and would like to discuss the findings with the Watermaster's TAC. They will provide an oral report on the key findings of their work at today's meeting.

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| **ATTACHMENTS:** | None |
| **RECOMMENDED ACTION:** | None required – information only |

## *SEASIDE BASIN WATER MASTER TECHNICAL ADVISORY COMMITTEE*

### ** * * AGENDA TRANSMITTAL FORM * * **

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| **MEETING DATE:** | January 8, 2014 |
| **AGENDA ITEM:** | 3 |
| **AGENDA TITLE:** | Continued Discussion of Potential Sources of Water That Could be Used to Replenish the Seaside Basin and Help to Achieve Protective Water Levels |
| **PREPARED BY:** | Robert Jaques, Technical Program Manager |

At its June 19, 2013 meeting the TAC recommended that the Board consider providing support to certain projects that the TAC deemed to be potential sources of water that could be used to replenish the Seaside Basin and help to achieve protective water levels. At its August 7, 2013 meeting the Board considered the TAC's recommendations and directed the TAC to:

1. Include projects related to runoff, storm water, and the Groundwater Recharge Project, including the MRWPCA/MPWMD Groundwater Replenishment Project (GWRP), the City of Seaside Groundwater Project (water not from the Seaside Basin), and the City Diversions of Stormwater to MRWPCA to Increase GWRP Quantities.
2. Remove projects that would most likely be required by Order 95-10 and the State Water Resources Control Board.
3. Including the projects that can most easily be implemented.
4. Provide information on the estimated amounts of water to be captured by each project.
5. Provide estimated timelines for each project.
6. Provide estimated costs per acre-foot for each project.
7. Provide information on potential grant or loan funding to local communities related to the State's Area of Special Biological Significance requirements.

Attachment A contains a Discussion Paper, which was included in the TAC's June 19, 2013 agenda packet, and which provides details on the projects that were investigated to determine if they had the potential to serve as a source of water that could be injected into the Basin to help achieve protective water levels. This water would be used to supplement the 25-years-at-700 AFY of in-lieu replenishment that Cal Am is planning to provide.

In order to compile the information requested by the Board, I requested the sponsors of several of the projects to provide me with additional information about their projects. I have used this information to prepare the "Summary of Information" table in Attachment B. Attachment C contains more detailed information on the two components of the City of Pacific Grove's Local Water Projects (Projects 5A and 5B).

The information in Attachment B indicates that the only projects which currently appear to have a reasonable potential to be implemented, and which could directly help to provide water for replenishment of the Seaside Basin, are:

- Seaside Basin ASR Expansion
- Expanded MRWPCA/MPWMD Groundwater Replenishment Project (GWRP)
- City Diversions of Stormwater to MRWPCA to Increase GWRP Quantities
- Possible Initially Unused Capacity in Cal Am's Regional Desalination Plant

***SEASIDE BASIN WATER MASTER***
***TECHNICAL ADVISORY COMMITTEE***

**** * * AGENDA TRANSMITTAL FORM * * ****

| **AGENDA ITEM:** | 3 (Continued) |
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With regard to funding support these projects may be seeking, it appears that at the present time none of these projects are seeking direct funding support from the Watermaster. Rather, some of them anticipate seeking State funding through the State Revolving Fund low-interest loan program, or other government-sponsored funding programs. However, showing community support via letters of support is often an important component of successfully applying for such funding programs.

The only "project" that may need direct funding by the Watermaster appears to be the purchase of additional water from Cal Am's desalination plant, if excess capacity is found to exist in that plant in its initial years of operation.

The TAC is requested to discuss these projects and provide input to the Technical Program Manager for him to use in developing a set of TAC recommendations to make to the Board. If the TAC wishes to recommend that the Board support each of these projects in whatever manner(s) the Board deems feasible and appropriate, forms of support at this point in time would probably only consist of letters of support . However, once the MPWSP becomes operational, the Board may wish to seek funds to purchase additional water from the desalination plant to help replenish the Seaside Basin.

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| **ATTACHMENTS:** | Attachment A: Discussion Paper on Potential Water Sources to Help Achieve Protective Water Levels<br>Attachment B: Summary of Project Information<br>Attachment C: Information Pertaining to City of Pacific Grove's Local Water Projects |
| **RECOMMENDED ACTION:** | Provide direction to Technical Program Manager on the recommendations the TAC wishes to make to the Board on this topic |

# ATTACHMENT A

**DISCUSSION PAPER**

**POTENTIAL SOURCES OF WATER
THAT COULD BE ACQUIRED AND INJECTED
TO
REPLENISH THE SEASIDE BASIN
AND
HELP TO ACHIEVE PROTECTIVE WATER LEVELS**

## BACKGROUND

Modeling work recently performed by HydroMetrics to assess the impacts of Cal Am's Board-approved in-lieu replenishment program found that:

1. Cal-Am's replenishment repayment program of 700 AFY for 25 years increases groundwater elevations in the shallow and deep aquifer coastal wells compared to the Baseline (i.e. no replenishment water), but in almost all locations falls well short of achieving protective elevations in these wells.
2. When combined with Cal-Am's replenishment program, protective elevations can be achieved at all of the coastal wells by injecting an additional 1,000 acre-feet per year of water into the existing ASR wells, with this additional water being left in the Basin and not pumped back out under the normal Aquifer Storage and Recovery cycle. This approach requires less outside Basin water to achieve protective elevations than having Standard and Alternative Producers reduce their pumping rates in order to achieve in-lieu replenishment.

During discussion of these findings it was learned that injection of water closer to the coast would likely achieve protective water levels more rapidly, and might do so with less water, than injection of water at the existing ASR sites. Consequently, HydroMetrics was contracted to perform additional modeling to determine the potential benefit of injecting water closer to the coast.

Regardless of where injection occurs, it will be necessary to obtain water from a source other than the Seaside Basin itself in order to supply the injection water. This Discussion Paper identifies and discusses a number of water supply projects to determine which of them appear to have a viable potential to provide water for injection.

## WATER SUPPLY PROJECTS INVESTIGATED

The following sources were consulted to identify water supply projects that might be able to provide water for injection:

1. RBF Consulting report to the Watermaster dated 2007.
2. The Watermaster's *Basin Management Action Plan*, dated February 2009 (specifically Sections 3 and 4).
3. Watermaster Memos pertaining to projects used in developing the Replenishment Assessment Unit Costs
4. MPWMD (Joe Oliver, Jon Lear, Larry Hampson, and Dave Stoldt)
5. MCWRA (Rob Johnson and Howard Franklin)
6. MRWPCA (Keith Israel and Bob Holden)

7. MCWD (Brian True)
8. City of Seaside (Rick Riedl)
9. City of Monterey (Norm Green and Tom Reeves)
10. City of Pacific Grove (Sarah Hardgrave)

The projects that were identified were:

1. Seaside Basin ASR Expansion
2. City of Sand City Desalination Plant
3. MPWMD Sand City Desalination Plant
4. MRWPCA/MPWMD Groundwater Replenishment Project (GWRP)
5. Regional Urban Water Augmentation Project (RUWAP)
6. Salinas River Surface Water Treatment Plant
7. City of Seaside Groundwater (not from the Seaside Basin)
8. City of Pacific Grove Local Water Projects (includes a stormwater component)
9. Water Conservation
10. City Diversions of Stormwater to MRWPCA to Increase GWRP Quantities
11. Possible Initial Excess Capacity of Cal Am's Regional Desalination Plant

A short description and discussion of each of these projects is provided below.

**1. Seaside Basin ASR Expansion**

ASR entails diverting excess winter flows from the Carmel River Basin during high flow periods using existing Cal Am wells in the lower stretches of the river. Diverted water is treated to potable drinking water standards and pumped through the Cal Am distribution system to the Seaside Basin, where the water is injected for later recovery during dry periods. MPWMD has operated a full-scale ASR test well (Santa Margarita Test Injection Well No. 1) since 2002, and a second injection/extraction well was completed in 2008. Maximum extraction capacity of the current ASR facilities is approximately 1,500 AFY.

Expansion of the ASR project would provide for a greater diversion of water from the Carmel River during high flows for transport and injection into the Seaside Basin, and could increase the maximum extraction to approximately 2,400 AFY. The facilities to accomplish this are included in the scope of Cal Am's Monterey Peninsula Water Supply Project, and include:

- Increased capacity in Cal Am's Carmel River Basin well capacity in order to deliver water for injection in the Seaside Basin
- Increasing the capacity of Cal Am's conveyance pipeline from the Carmel River Basin in order to be able to deliver the peak instantaneous flow of injection water to the Seaside Basin
- Making some other improvements in Cal Am's distribution system in order to remedy limitations in getting water to the ASR sites while simultaneously meeting Cal Am's system demands

This project is being pursued jointly by MPWMD and Cal Am. Up until the time that Cal Am reduces its Carmel River diversions in accordance with the SWRCB's Cease and Desist Order No. 95-10, all of the water production of this project has to be used by Cal Am to reduce the amount of water it takes from the Carmel River Basin. Therefore, up until that point in time, which will correspond to the time that Cal Am's Monterey Peninsula Water Supply Project becomes fully operational, this project will not be able to serve as a potential source of supplemental replenishment water for the Seaside Basin. However, once the Cease and Desist Order has been satisfied, in the wet years in which ASR injection water quantities greater than 1,300 AFY are available, it may be permissible to inject and leave in the Seaside Basin at least some portion of any amount over 1,300 AFY, without having to pump it out to reduce Cal Am's Carmel River Basin diversions. **This would be a potential additional source of replenishment water for injection.**

**2. City of Sand City Desalination Plant**

The City of Sand City has constructed and is operating, under a contract with Cal Am, a 300 AFY desalination plant. The source water for the desalination plant is shallow brackish water from the Southern Coastal Subarea. The City of Sand City was granted rights to pumping this brackish water in the Court Decision that created the Watermaster. Water produced by this plant will be supplied to the CAW system on an interim basis until Sand City customers use the water for their own purposes. The water is not dedicated to offsetting the extraction deficit of SWRCB Order No. 95-10 pertaining to Cal Am's diversions from the Carmel River Basin.

All of the water that is not needed for new connections within Sand City will be used by Cal Am to reduce the amount of water it takes from the Carmel River Basin. Therefore, **this would not be a potential additional source of replenishment water for injection.**

**3. MPWMD Sand City Desalination Plant**

A desalination plant was proposed by MPWMD in 1995 in response to SWRCB Order No. 95-10. The plant would collect seawater through wells located in Sand City. The proposal was not implemented at the time. A bond measure sponsored by MPWMD to provide funding for this project was defeated, and the project was therefore dropped. It would likely only be reconsidered if the Cal Am Monterey Peninsula Water Supply Project could not be implemented. **This would not be a potential additional source of replenishment water for injection.**

**4. MRWPCA/MPWMD Groundwater Replenishment Project (GWRP)**

Cal Am's Monterey Peninsula Water Supply Project contains two plant size alternatives, one which has a 9,000 AFY seawater desalination plant, and a second one which has a 5,500 AFY desalination plant and a Groundwater Replenishment Project (GWRP) delivering 3,500 AFY of water for replenishment of the Seaside Basin.

With regard to the GWRP component of the second alternative, although there is not yet a formal water purchase agreement in place, institutional agreements are being pursued between MRWPCA, MPWMD, and Cal Am such that:

- MPWMD would enter into a Storage and Recovery Agreement with the Watermaster.
- MPWMD would buy recycled water from MRWPCA when that water is injected into the Seaside Basin. The purchase price for the recycled water would cover O&M, Capital Recovery, and Administrative expenses of MRWPCA and MPWMD.
- 6 months after injection occurs (in order to comply with State Department of Public Health requirements pertaining to groundwater replenishment) Cal-Am would purchase potable water from MPWMD and either withdraw it from the ground or leave it for withdrawal later.

This approach is very similar to the manner in which MPWMD financed the reclamation project at Carmel Area Wastewater District.

At the TAC's May 2013 meeting MRWPCA reported that the GWRP is planning on providing 3,500 acre feet per year for replacement water to Cal Am (as discussed above), but that the GWRP might be capable of also providing approximately 1,000 acre feet per year for replenishment of the Seaside Basin. It was also reported that this is currently being studied by MRWPCA and would be discussed in the CEQA EIR that MRWPCA is preparing for the GWRP. However, the management of MRWPCA and MPWMD subsequently determined not to include the potential to provide additional water from the GWRP in this EIR. In conjunction with potentially being able to provide additional water, MRWPCA reported it was looking for sources of water to augment its decreasing influent flows of wastewater. Potential augmentation flows it is examining include stormwater flows from its member entities (discussed below under Project No. 10), and the City of Salinas' industrial wastewater flows currently being treated at that city's industrial wastewater treatment plant.

This additional 1,000 AFY is not currently included in the scope of Cal Am's Monterey Peninsula Water Supply Project, but **would be a potential additional source of replenishment water for injection.**

**5. Regional Urban Water Augmentation Project (RUWAP)**

The RUWAP project consists of construction by MCWD of a recycled water distribution system to provide up to 1,727 acre-feet per year (AFY) of recycled water from MRWPCA's existing Salinas Valley Reclamation Plant (SVRP) to urban users within the Ord Community (former Fort Ord) and the Monterey Peninsula. Approximately 300 AFY would be made available to the Monterey Peninsula with the remainder being supplied for redevelopment of Fort Ord. Additional facilities to store recycled water during winter would be needed to meet instantaneous summer-time demands and to increase the project yield to an envisioned 3,000 AFY. The MCWD recycled water system would service existing and new water users within the Fort Ord community and the City of Marina. Existing users' irrigation systems would be disconnected from the potable water system and would tie directly into the new recycled water system.

With the exception of a winter storage reservoir, the project design is essentially complete, and much of the right-of-way for the pipelines has been acquired. Some sections of pipeline have already been installed as components of roadway projects constructed under the Fort Ord Reuse Plan.

The potential demand for recycled water from this project is approximately 550-700 AFY within the City of Seaside, CSUMB, and the City of Marina. The bulk of this (450 to 500 AFY) is the irrigation demand of the two City of Seaside golf courses.

Development fees from Fort Ord redevelopment projects are needed to help fund the project's capital costs. The project is on hold at this time due to slow progress on redevelopment of the former Fort Ord. In the meantime MCWD and MRWPCA are seeking additional participants to increase the demand for recycled water to make the project economically feasible. It appears that the project is at least 3 to 5 years away from implementation.

The only direct benefit to the Seaside Basin from this project would be the reduction of pumping by the Seaside Golf Courses' two wells that draw from the Seaside Basin. All of the other markets for the recycled water are currently served by water from the Salinas River Basin. Thus, if this project were to be implemented, it would have the potential of providing in-lieu replenishment of the Seaside Basin only by reducing pumping for the Seaside Golf Courses, and **would not be a potential additional source of replenishment water for injection.**

**6. Salinas River Surface Water Treatment Plant**

The Salinas River Surface Water Treatment Plant was previously included as part of Cal Am's now-abandoned Monterey Regional Water Supply Program, and would have worked conjunctively with the Regional desalination plant using surface water diverted from the Salinas River to provide potable water. Even when the project was still being considered as part of the Monterey Regional Water Supply Program, the MCWRA Board had not identified it as a future project that MCWRA would be implementing because the cost data and a proposed schedule for implementing the project had not been closely examined to determine their reasonableness. Also, the project had not been vetted in the Salinas Valley and there was concern that it could cause controversy if it were to be included. The project is either on hold or has been dropped, and therefore **would not be a potential additional source of replenishment water for injection.**

**7. City of Seaside Groundwater (not from the Seaside Basin)**

The City of Seaside is pursuing a drainage study to see if Laguna Grande could be dredged to serve as a reservoir for storing storm water and ground water runoff for use in irrigating landscaping near the lake and the Seaside City Hall, or to serve as a source of water that could be treated and provided to Cal Am for potable use within Cal Am's distribution system.

The City has also looked at the potential to use water from its irrigation well located near the lake as a source of water that could be treated and provided to Cal Am for potable use within Cal Am's distribution system. Due to the existence of a fault in the strata, this well reportedly does not draw from the Seaside Basin. However, the City is no longer considering this because a hydrogeologist informed them that the well would likely not provide enough reliable water production to make the project worth pursuing.

If water from Laguna Grande could be treated for use by Cal Am to help serve its potable water demands, it could enable Cal Am to produce less water from its desalination plant to meet potable water demands, thus potentially freeing up some capacity in that plant for use in supplying replenishment water. Thus, this project **could indirectly create a potential additional source of replenishment water for injection.**

**8. City of Pacific Grove Local Water Projects (includes a stormwater component)**

One requirement of the SWRCB's October 20, 2009 Cease and Desist Order (CDO) to Cal Am is described in *Section16.7 - Small Projects*. This Section states in part that *"Other small projects that could provide a temporary supply of water may also be available. The addition of temporary small water supply projects would reduce Cal-Am's need to illegally divert water from the river. We conclude that Cal-Am should be required to develop small projects to provide a temporary supply of water for its customers and to reduce the illegal diversions from the river."*

This is formally required of Cal Am under Condition No. 5 of the CDO which states in part *"Cal-Am shall implement one or more small projects that, when taken together, total not less than 500 AFY to reduce unlawful diversions from the river"* and *"To the maximum practicable extent, small projects shall be operated to reduce illegal diversions from the river during the months when surface flow in the river begins to go dry and through the months when surface flow in the river disappears below river mile 6.5."*

The City of Pacific Grove has proposed a "Local Water Project" to the CPUC for consideration and inclusion in the environmental documentation being prepared for Cal Am's Monterey Peninsula Water Supply Project. One purpose of this Local Water Project is to replace certain irrigation demands in Pacific Grove with non-potable sources to help Cal Am meet its obligations to find a replacement to its use of water from the Carmel River. The proposed Local Water Project reportedly would have the potential to reduce potable water demand within the City by up to 125 AFY. This water would be produced by diverting portions of the City's sanitary sewer flows to either a satellite reclamation plant that the City would construct at its former wastewater treatment plant site at Point Pinos, and/or by diverting portions of its sanitary sewer flows to the Carmel Area Wastewater District's reclamation plant, with an equivalent volume of reclaimed water being returned to the City. In each instance the reclaimed water would be used by the City to supply some of its landscape irrigation demands, including its municipal golf course and its cemetery.

The Local Water Project also includes a component to acquire and use the David Avenue Reservoir (currently owned by Cal Am and used as a corporation yard for its maintenance equipment and personnel) to capture and treat stormwater for reuse. Under this component, dry and wet weather flows that originate in the City of Pacific Grove, and some of the New Monterey portion of the City of Monterey, and which discharge to the Pacific Grove ASBS, would be collected and distributed to the Cal-Am Reservoir for equalization and treatment. This water could subsequently be used for irrigation and/or aquifer injection in the Seaside Basin. This stormwater capture and treatment component is being separately evaluated by the cities of Pacific Grove and Monterey, along with other alternatives intended as a means of helping these cities comply with ASBS discharge requirements, under the Integrated Regional Water Management Program (IRWMP) that is overseen by the MPWMD.

When asked if the City of Pacific Grove would be seeking any water credits to use for development as a result of reducing its demand on the Cal Am system from any of these projects, the City replied that until Cal Am's CDO requirements are met, the project(s) would simply be intended to reduce potable water demand on the Cal-Am system. However, after the CDO requirements were met and replacement supplies were in place, the City said it would likely seek a new allocation from MPWMD for the offset of potable water use. Presumably any increase in the City's current allocation would be used by the City to serve new developments. In that case there would be no long-term reduction in Cal Am's water supply demand.

If these projects are included by the CPUC to help reduce Cal Am's use of water from the Carmel River Basin and result in a commensurate reduction in the sizing of the Regional desalination plant, then they would not free up any capacity in that plant and **would not create a potential additional source of replenishment water for injection.** However, if these projects were constructed and did not reduce the anticipated increased size of the Regional desalination plant, then they could free up capacity in that plant and **could indirectly create a potential additional source of replenishment water for injection.** Also, if the stormwater component of these projects were to treat and deliver water directly to the Seaside Basin, it **would provide a potential additional source of replenishment water for injection.**

The sanitary sewer flow diversion projects to provide recycled water for use in Pacific Grove would reduce the amount of water available for reclamation by the GWRP (described above under Project No. 4), and in that sense would be competing with that project.

The potential benefit to the Seaside Basin of Pacific Grove's Local Water Project will not be known until further decisions are made by the CPUC and Cal Am, the sizing of the Regional desalination plant has been determined, and the feasibility and methods of funding the Local Water Project components have been ascertained by the City.

**9. Water Conservation**

Cal Am, MPWMD, and the City of Seaside (for its municipal water system) are implementing conservation programs to reduce overall demand and the need for potable water. MPWMD evaluated the findings of reports by other agencies regarding eight different water conservation retrofits/installations for commercial, industrial, and institutional services, and a Water Conservation Alternatives Evaluation was prepared to quantify the average benefit-to-cost ratio for the retrofits, in order to identify which retrofits could best be incorporated into a comprehensive Conservation Program. The evaluation was used to prioritize and identify retrofit programs that would offer maximum cost savings. MPWMD has already achieved its 20%-by-2020 water conservation goal, and further reductions in demand as a result of conservation measures will likely be less significant. The water that is saved reduces the demand on the potable water system, and if successful could enable Cal Am to produce less water from its desalination plant to meet potable water demands. This would potentially free up some capacity in that plant for use in supplying replenishment water. Thus, conservation **could indirectly create a potential additional source of replenishment water for injection.**

**10. City Diversions of Stormwater to MRWPCA to Increase GWRP Quantities**

MRWPCA: As part of a feasibility study to identify source waters for the GWRP, MRWPCA will be examining how much stormwater might be available from its member entities that could be diverted to the sanitary sewer system to augment influent flows to MRWPCA's Regional treatment facilities. MRWPCA has made initial contacts with several cities, and those cities expressed interest in this concept. MRWPCA intends to pursue those discussions with them. If the quantities of stormwater are large enough, MRWPCA will then decide if the diverted stormwater could be made available for the GWRP at a reasonable cost.

At this point MRWPCA is in the early stages of work on the concept of stormwater diversions, and it will probably be late summer of 2013 before they can determine whether or not it is practically and

economically feasible. It was reported by MRWPCA in early May that this topic would be included in their CEQA EIR Notice of Preparation document for the GWRP, which was released in late May 2013. However, it appears that MRWPCA made a subsequent decision not to include this in the NOP, and therefore not to include it in the EIR.

Monterey: Some months ago Norm Green had mentioned the possibility of using some of the City's Lake El Estero water as a source of supplemental water. However, the City now believes that this is a pretty remote possibility other than for winter flows. They report that during the dry season, there just isn't much water flowing into the lake. With regard to storm water, an ASBS alternatives analysis they are doing is looking at ways in which the David Avenue reservoir could be used to store peak storm water flows (this is also discussed above under the City of Pacific Grove's Project No. 8). One option that is being considered is to meter the stored storm water into the sanitary sewer system at a treatable and transportable rate. This could help increase the amount of water available from MRWPCA's GWRP.

Seaside and Pacific Grove: Possibly in conjunction with some infrastructure work they hope to get grant funding to do on their storm drainage systems under the IRWMP, these cities reported that they are interested in talking with MRWPCA about being able to discharge storm water (in a controlled manner) into the sanitary sewer system, similar to what Monterey is considering, in order to increase flows to MRWPCA's recycling plant.

If, by accepting diversions of stormwater flows from its member entities, MRWPCA is successful in increasing the quantity of water that its GWRP can supply, this **would create a potential additional source of replenishment water for injection.**

### 11. Possible Initial Excess Capacity of Cal Am's Regional Desalination Plant

The information in this section is taken largely from materials prepared by MPWMD for its Special Board meeting held on February 12, 2013, and from documents prepared by Cal Am.

Cal Am has indicated that it will seek (or may already have done so) approval by the CPUC to increase the size of the Regional desalination plant under the Monterey Peninsula Water Supply Project in order to: (1) provide replenishment water to the Seaside Basin, (2) provide service for the build-out of the Pebble Beach Company's projects, (3) provide water to support the anticipated "bounce back" in local tourism that will result from the improving economy, and (4) to serve legal lots of record that are not currently being served. The anticipated requested increase in desalination plant size is summarized in the table below:

| **Demand** | **AFY** |
|---|---|
| Seaside Basin Replenishment | 700 |
| PBC Projects Build-out | 325 |
| Tourism "bounce back" | 500 |
| Lots of Record | 1,180 |
| **Total** | **2,705** |

The report to MPWMD's Board for its February 12, 2013 meeting commented that MPWMD staff felt some of the demands listed in the table above were overly conservative, at least in the early years, as follows:

1. In the sizing of the desalination plant Cal Am had used a 5-year average to establish its current demand. The 5-year average Cal Am used was 13,291 AFY. MPWMD pointed out that Cal Am's current actual demand is only approximately 12,500 AFY.

2. As MPWMD understands it, the water demand cited in the EIR for build-out of PBC's Projects is only 135 AFY, rather than the 325 AFY used by Cal Am.
3. MPWMD's analysis of commercial water demands in the early-to-mid 2000s, compared to current commercial water demands (during the current economic downturn period) indicates current demand is only about 200 to 400 AFY below pre-economic downturn demand, rather than the 500 AFY used by Cal Am in its plant-sizing analysis.
4. The lots of record demand of 1,180 AFY was reportedly taken from a 2001 MPWMD analysis, but MPWMD does not recommend continued use of this value. MPWMD indicated it planned to examine more recent reports to try to provide an updated figure.

For the reasons stated above, there may be excess capacity available in the Regional desalination plant in its early years of operation. If so, that excess capacity **could provide a potential additional source of replenishment water for injection.**

## CONCLUSIONS AND RECOMMENDATIONS

Of the projects discussed above several appear to offer the potential to provide a source of replenishment water for injection. However, only a few of these appear to be sufficiently developed to warrant being pursued at this point. The TAC's recommendations in this regard are discussed below.

1. Seaside Basin ASR Expansion. The ASR project has already been partially constructed and has been operational for a number of years. The expansion facilities are included in the scope of Cal Am's Monterey Peninsula Water Supply Project. The quantities of water that might be available from this project to be injected and left in the Seaside Basin are not known, and would be subject to hydrologic conditions each year. Nevertheless, any amount above the 1,300 AFY of ASR water that Cal Am is counting on to meet demands under its Monterey Peninsula Water Supply Project would benefit the Seaside Basin.
2. MRWPCA/MPWMD Groundwater Replenishment Project (GWRP). This project is already included in Cal Am's Monterey Peninsula Water Supply Project, assuming that it can successfully obtain all of the necessary permits and approvals within the timeframe needed by Cal Am to make a final determination on the size of the Regional desalination plant. If the GWRP successfully achieves these objectives, the same facilities that will be constructed to deliver the 3,500 AFY of GWRP water that Cal Am will be counting on to meet demands will have the potential, if MRWPCA can increase its influent wastewater flows so that it has more water to recycle, to deliver water that could be injected and left in the Seaside Basin.
3. Regional Urban Water Augmentation Project (RUWAP). Although this project would not provide water that could be used to replenish the Seaside Basin by direct injection, it would benefit the Basin through in-lieu replenishment.
4. City of Seaside Groundwater (not from the Seaside Basin). This project appears to have the potential to indirectly provide a source of water to replenish the Seaside Basin by injection, by reducing the amount of water Cal Am would need from the Regional desalination plant to meet its demands. However, at this point it is not developed sufficiently to determine how much water it might be able to provide, whether the necessary permits and approvals could be obtained, and whether it is economically feasible.
5. City of Pacific Grove Local Water Projects (includes a stormwater component). Depending on how these project(s) are ultimately configured, they may have the potential to directly or indirectly provide a source of water to replenish the Seaside Basin by injection. The potential benefit to the Seaside Basin of these projects will not be known until further decisions are made by the CPUC and Cal Am, the sizing of the Regional desalination plant has been determined, and the feasibility and methods of funding the Local Water Project components have been ascertained by the City.

6. Water Conservation. Because much water conservation has already been achieved, it is expected that any further water savings would likely be small. However, any such savings have the potential to indirectly provide a source of water to replenish the Seaside Basin by injection, by reducing the amount of water Cal Am would need from the Regional desalination plant to meet its demands.
7. City Diversions of Stormwater to MRWPCA to Increase GWRP Quantities. If MRWPCA is successful in increasing the quantity of water that its GWRP can supply by accepting diversions of flows from its member entities, this would create a supplemental source of water to replenish the Seaside Basin by direct injection.
8. Initial Unused Capacity of Cal Am's Regional Desalination Plant. If in fact it is found that there is unused capacity in the Regional desalination plant in its early years of operation, that unused capacity could provide a potential additional source of replenishment water for injection. Presumably the only costs to produce this water would be the O&M costs, as the treatment and transmission facilities would have already been constructed and capitalized under the Monterey Peninsula Water Supply Project.

**ATTACHMENT B**

**Summary of Project Information**

| No. | Project | Description | Feasibility and Ease of Implementation | Estimated Cost of Water | Implementation Timeline | Quantity of Water that the Project Could Provide | Potential to Obtain Funding from Outside Sources |
|---|---|---|---|---|---|---|---|
| 1 | Seaside Basin ASR Expansion | Injecting and leaving in the Seaside Basin any amounts of ASR water above the 1,300 AFY that Cal Am is counting on to meet demands under its Monterey Peninsula Water Supply Project. | The project is quite feasible, as demonstrated by the existing ASR project. Expanding the amount of water provided by the ASR project would be easy to implement, since it would use the existing ASR facilities. | $2,734/AF | Water from this project could be available in 2015. | 1,000 AFY | MPWMD and CAW will likely fund this project, as they have the existing ASR project, unless they are able to secure grant funding to assist. |

| No. | Project | Description | Feasibility and Ease of Implementation | Estimated Cost of Water | Implementation Timeline | Quantity of Water that the Project Could Provide | Potential to Obtain Funding from Outside Sources |
|---|---|---|---|---|---|---|---|
| 2 | Expanded MRWPCA/ MPWMD Groundwater Replenishment Project (GWRP) | Recycled water that MRWPCA could produce above the 3,500 AFY that will be needed for the Monterey Peninsula Water Supply Project. | If the GWRP proves feasible and is incorporated into CAW's Monterey Peninsula Water Supply Project, then it should be feasible to increase the production of recycled water if additional feed water to the GWRP can be acquired. Although MRWPCA reports that political issues are strong and may slow down or derail certain water agreements, they are optimistic about obtaining the needed approvals and agreements. Both the RWQCB and the CDPH are supportive of the project. Permitting is not expected to be a problem, because the project intends to exceed CDPH's draft requirements. A few people have expressed opposition to the GWR concept, but the majority of people MRWPCA has contacted or who have contacted them were in favor of GWR. Increased public outreach is being started. | $2,000/AF to $4,000/AF | Water from the initial project under the MPWSP could be available in 2017 The CEQA process is expected to be completed by the end of 2014. The CPUC is expected to rule on the water purchase agreement in July 2015. Con-struction of a new replenishment-only project would probably take about 3 years to implement, including its CEQA process. | No additional water would be available from the 3,500 AFY committed to the MPWSP. MRWPCA would probably consider a new, pure replenish-ment project in the future. | Based on MRWPCA's discussions with the SWRCB, the Bureau of Reclamation, and the Department of Water Resources, the initial project under the MPWSP should be eligible for several types of grants and loans A new replenishment-only project should be eligible for an SRF loan and might also be eligible for grants and other loans due to the waters that would be reused for that project. It is impossible to determine the likelihood without first identifying the specifics of the project. |

| No. | Project | Description | Feasibility and Ease of Implementation | Estimated Cost of Water | Implementation Timeline | Quantity of Water that the Project Could Provide | Potential to Obtain Funding from Outside Sources |
|---|---|---|---|---|---|---|---|
| 3 | Regional Urban Water Augmentation Project (RUWAP) | A recycled water distribution system to provide recycled water from MRWPCA to urban users within the former Fort Ord and the Monterey Peninsula. However, this project would not provide a source of water for injection into the Basin. | The project has been designed and some or perhaps all of the CEQA process has been completed. However, the project is dependent on revenues from the sale of recycled water, and from redevelopment fees from the former Fort Ord, in order to be financially viable. The project is on hold at this time due to slow progress on redevelopment of the former Fort Ord. | $2,476/AF | Unknown. | Potentially up to 3,000 AFY, but this would not be available as a source of water for injection into the Basin. | Unknown. However, based on information from other projects this project would appear to be potentially eligible for an SWRCB SRF loan. |

| No. | Project | Description | Feasibility and Ease of Implementation | Estimated Cost of Water | Implementation Timeline | Quantity of Water that the Project Could Provide | Potential to Obtain Funding from Outside Sources |
|---|---|---|---|---|---|---|---|
| 4 | City of Seaside Groundwater (not from the Seaside Basin) | Storm water and ground water runoff could potentially be captured and stored in Laguna Grande, and then treated and provided to Cal Am for potable use within Cal Am's distribution system. | Unknown at this time. Project is in the early phase of assessment by the City of Seaside. | No information available. | A study of drainage into Laguna Grande should be completed within the next few months. | No information available. | No information available. |

| No. | Project | Description | Feasibility and Ease of Implementation | Estimated Cost of Water | Implementation Timeline | Quantity of Water that the Project Could Provide | Potential to Obtain Funding from Outside Sources |
|---|---|---|---|---|---|---|---|
| 5A | City of Pacific Grove Local Water Project – Wastewater Recycling Component | This project consists of diverting portions of the City's sanitary sewer flows for recycling and reuse within the City. However, this project would not provide a source of water for injection into the Basin. | CEQA compliance and permitting issues are currently being worked on by the City. Obtaining a Coastal Development Permit for certain of the components may be a significant challenge. No public acceptance difficulties have thus far been experienced. | No cost information is currently available – final cost estimates are still being developed. | This project is projected to potentially be operational by late 2015. | 475 AFY. However, this will likely all be used within the City and not be available for replenishment of the Seaside Basin. | The City is seeking funding from the SWRCB's State Revolving Fund (SRF) Loan Program. The Project is included in the Integrated Regional Water Management Plan (IRWMP) that is being administered by MPWMD. |

| No. | Project | Description | Feasibility and Ease of Implementation | Estimated Cost of Water | Implementation Timeline | Quantity of Water that the Project Could Provide | Potential to Obtain Funding from Outside Sources |
|---|---|---|---|---|---|---|---|
| 5B | City of Pacific Grove Local Water Project – Stormwater Recycling Component | This project consists of using CAW's David Avenue Reservoir to capture stormwater for treatment and either ocean discharge or reuse by the GWRP. This project is being evaluated by the cities of Pacific Grove and Monterey as a means of helping these cities comply with their ASBS discharge requirements | CEQA compliance and permitting issues are currently being worked on by the City. Obtaining a Coastal Development Permit and approvals from the State Division of Safety of Dams may be significant challenges. No public acceptance difficulties have thus far been experienced. | No cost information is currently available – final cost estimates are still being developed. | Implementation timeline will depend upon the outcome of water quality monitoring and funding availability. | Some portion of an estimated 47 AFY of dry weather storm water runoff, and some portion of an estimated 580 AFY of wet weather storm water runoff that this project would capture could be provided to MRWPCA as additional feed water for the GRWP. | Project financing is yet to be worked out. However, it is expected to be eligible for funding under the SWRCB's State Revolving Fund (SRF) Loan Program. |

| No. | Project | Description | Feasibility and Ease of Implementation | Estimated Cost of Water | Implementation Timeline | Quantity of Water that the Project Could Provide | Potential to Obtain Funding from Outside Sources |
|---|---|---|---|---|---|---|---|
| 6 | Water Conservation | There was consensus that further water conservation beyond that which has already been achieved has a low potential to produce a meaningful quantity of water for replenishment. | N/A | N/A | N/A | N/A | N/A |
| 7 | City Diversions of Stormwater to MRWPCA to Increase GWRP Quantities | Diversions of stormwater flows from MRWPCA member entities to increase the amount of recycled water the GWRP can produce. | It is feasible and relatively straightforward to controllably divert storm water flows into the MRWPCA sanitary sewer system to increase feed water to the GWRP. | No cost information is currently available. A study of this has not yet been performed. | No timeline information is currently available. At this point MRWPCA is in the early stages of work on the concept of stormwater diversions. | Other than for Pacific Grove (Project No.5B), no information is currently available. A study of this has not yet been performed. | No information is currently available. However, based on Project 5B it is expected that stormwater diversion projects could be eligible for funding under the SWRCB's SRF Loan Program. |

| No. | Project | Description | Feasibility and Ease of Implementation | Estimated Cost of Water | Implementation Timeline | Quantity of Water that the Project Could Provide | Potential to Obtain Funding from Outside Sources |
|---|---|---|---|---|---|---|---|
| 8 | Possible Initially Unused Capacity in Cal Am's Regional Desalination Plant | Unused capacity in the Regional desalination plant in its early years of operation. | This would be easy to implement, since it would only consist of using the desalination facilities that will have already been constructed by CAW under the MPWSP. | $4,188 | This project is projected to be operational by late 2018. | Exact quantity not known but potentially could be well over 1,000 AFY in the initial years of operation of the MPWSP. | No outside funding would be required for construction of any facilities, since the already-constructed MPWSP facilities would be used to produce this water. Funding would be needed, however, to purchase the additional water from the MPWSP. No outside funding sources for this purpose have thus far been identified. |

# ATTACHMENT C
## Information Pertaining to City of Pacific Grove Local Water Projects

CITY OF PACIFIC GROVE LOCAL WATER &&

| | QUESTIONS | RESPONSE | |
|---|---|---|---|
| | | PGLWP (Wastewater Recycling) | ASBS (Stormwater Recycling) |
| 1 | How easily the project could be implemented, taking into account: | There are no "political issues" that could effect implementation of either project. | |
| | a. Political issues | The proposed project would divert City wastewater prior to entering the regional collection/treatment system. The volume of wastewater proposed for recycling is approximately 0.6% of the influent to the RTP. | The proposed project would divert and treat an estimated 627 AFY of dry & wet weather storm water runoff, predominately from the City of PG. Dry weather flows would continue to be conveyed to the RTP for treatment and potential inclusion in the GWR. Wet weather flows would be treated prior to any discharge to the PGASBS or could be conveyed to the RTP for possible inclusion in the GWR. |
| | b. Project financing | The project is estimated to cost $20 M and is seeking a low-interest loan from the CWSRF Program. | Project financing is yet to be worked out for the project, however, it would be eligible for a low-interest loan from the CWSRF Program. |
| | c. Permitting | Currently underway with CEQA compliance and evaluations of their regulatory permitting requirements. Will likely require a Coastal Development Permit, that may represent the most challenging regulatory compliance issue. | Currently underway with CEQA compliance & evaluations of their regulatory permitting requirements. Will likely require a Coastal Development Permit, and approvals from the state Division of Dam Safety, sections 401 and 404 of the Clean water Currently underway with CEQA compliance and evaluations of their regulatory permitting requirements. Will likely require a Coastal Development Permit may represent the most challenging regulatory compliance issue. |
| | d. Public acceptance | Thus far the public has received both projects with support. | |
| | e. Any other issues specific to the project | | |
| 2 | The estimated amount of water that could potentially be provided by the project for use in direct replenishment of the Seaside Basin. | The available volume is 600 AFY available less the irrigation demand at the Golf Course & Cemetery (125 AFY) = 475 AFY | The estimated annual volume of wet weather flow = 580 AFY. Dry weather flows would be considered to remain diverted to the RTP for treatment. |
| 3 | Estimated implementation schedule for the project. | Operational by September 2015. | Implementation scheduling will depend upon the outcome of water quality monitoring and funding availability. |
| 4 | Estimated cost per acre-foot of water produced by the project. | Final cost estimates are still being developed. | |
| 5 | Potential for the project to receive grant or loan funding, including State funding assistance to local communities related to the State's Area of Special Biological Significance requirements. | CWSRF Funding is highly likely. Grants and other loan sources are under continual evaluation | |

## *SEASIDE BASIN WATER MASTER TECHNICAL ADVISORY COMMITTEE*

### ** * * AGENDA TRANSMITTAL FORM * * **

| | |
|---|---|
| **MEETING DATE:** | January 8, 2014 |
| **AGENDA ITEM:** | 4 |
| **AGENDA TITLE:** | Update on HydroMetrics Modeling of Laguna Seca Subarea |
| **PREPARED BY:** | Robert Jaques, Technical Program Manager |

**SUMMARY:** The attached HydroMetrics Technical Memorandum on the Laguna Seca Safe Yield Analysis provides some very significant insights into the Laguna Seca Subarea and to the Seaside Basin. The principle conclusions of the Memorandum are:

1. Even if Cal-Am discontinues all pumping from its Laguna Seca subarea wells, groundwater elevations in the subarea will continue to decline. The eastern side of the subarea will suffer the greatest and most persistent declines. With all Cal Am pumping in this subarea eliminated, groundwater elevations will fall below the top of the well screens under pumping conditions in several production wells prior to 2041.
2. The model estimates that the average annual natural safe yield from the Laguna Seca subarea is only 240 acre feet per year. This is considerably lower that the perennial safe yield of 608 acre feet per year set forth in the adjudication Decision. This finding is particularly significant because 240 acre feet per year is much less than the 644 acre feet per year of annual production allocated to the Alternate Producers alone in the Laguna Seca.
3. Even if pumping in the Laguna Seca subarea is reduced to the natural safe yield of 240 acre feet per year, groundwater levels that will be high enough to keep levels at all wells above their well screens cannot be achieved. This is because there are seasonal and year-to-year variations in the amount of rainfall recharge of the subarea, and the amount of pumping needed to meet seasonal demands, resulting in fluctuating groundwater levels.
4. Eliminating all pumping from the subarea (including pumping by all Alternate Producers) does not completely halt the predicted decline in groundwater elevations in the easternmost monitoring wells.
5. Pumping from wells east of the Laguna Seca subarea influences groundwater elevations in the eastern portion of the Laguna Seca subarea. These wells (outside of the Laguna Seca subarea) are contributing to the subarea's inability to achieve stable groundwater elevations.
6. The influence of well pumping outside of the Laguna Seca subarea could be evaluated using the groundwater model as follows: Multiple scenarios could be run in which pumping from individual wells outside of the Laguna Seca subarea is either removed or their pumping is reduced. The resulting changes to groundwater levels in the Laguna Seca subarea could then be compared to baseline conditions to determine the influence that each of these wells has on the subarea.

By way of explanation of some of these conclusions, the Natural Safe Yield is a mass balance number that simply looks at inflows and outflows to a basin. It assumes that it is possible to extract the positive difference between inflows and outflows, and that is the natural safe yield. However, depending on well locations, pumping this amount may still result in lowering groundwater levels. For example, if all the wells in a basin were concentrated in a single city block, one might have a natural safe yield of so many acre-feet per year based on a water balance approach, but you could not extract that much water from this tight cluster of wells without the wells going dry. This is why the concept of an "operational safe yield" was suggested by HydroMetrics. The operational safe yield accounts for the actual locations of existing

| **AGENDA ITEM:** | 4 (Continued) |
|---|---|

(or planned) wells. The operational safe yield looks at how much water can be practically extracted without causing undesirable lowering of groundwater levels in wells. The operational safe yield is always equal to or less than the natural safe yield.

At the November TAC meeting several issues were raised which the TAC may wish to further discuss at today's meeting, including:

1. Mr. Riedl inquired about the request made by the Wang subdivision proponents to the Watermaster about a year ago to get the Watermaster's approval to put in wells along Highway 68 in this immediate vicinity. Mr. Lear responded that the Wang subdivision geohydrologist had provided a report at that time indicating that these wells would not have an impact on the Seaside Groundwater Basin. Mr. Lear went on to say, however, that since then the MPWMD has obtained information suggesting that these wells could impact the Seaside Groundwater Basin. Question: What is this new information? Does it suggest that the Watermaster should reconsider its position regarding the Wang subdivision wells?

2. Mr. Costa asked Mr. Williams if the model could be used to estimate the impact of reducing the outside-Basin pumping and Mr. Williams responded that it could. Question: Is this something that the TAC wishes to recommend to the Board to be pursued via further modeling?

3. Mr. Williams asked if there was a need to answer at this time the many questions that were discussed at the November meeting, and wondered if CAW would change its plans for its Laguna Seca subarea operations depending on the results of this work. Mr. Hulbert said he was not sure but would discuss this with Mr. Sabolsice. Question: What is CAW's position on this?

4. Mr. Lear suggested that finding out when dropping groundwater levels will eventually impact Alternate Producers would be a good question to answer. Mr. Williams noted that there may be a policy issue that needs to be raised with the Court as a result of the information thus far from this modeling work. Question: Is this something that the TAC wishes to recommend to the Board to be pursued via further modeling?

5. Mr. Hulbert said that CAW plans to service its Laguna Seca subarea customers from its Main System in the future, but would like to keep its Laguna Seca subarea wells operational to provide redundancy. Mr. Lear noted that CAW could consider extending its Main System service to its Toro and Ambler Park well customers. Mr. Lear noted that CAW's Bay Ridge well is outside the Basin but was actually included in the Decision. Question: Is this anything that would require having further modeling done? If so, Is this something that the TAC wishes to recommend to the Board to be pursued via further modeling?

6. Mr. Lear said he would like to see the timeline regarding when Alternate Producers would experience "material injury". Mr. Williams said that is within the current scope of work. Question: Does the TAC recommend having HydroMetrics develop this information within its current scope of work and budget, i.e. at no additional cost to the Watermaster beyond the RFS amount already authorized?

One of the responsibilities of the Watermaster is to prevent material injury from occurring to any of the producers in the Basin. So it is my belief that the Watermaster needs to deal with these issues head-on, and not put them on the back burner. If groundwater levels fall below the pumping screen in a well, the well is deemed to have suffered material injury. Based on the findings of the model, material injury will

## *SEASIDE BASIN WATER MASTER*
## *TECHNICAL ADVISORY COMMITTEE*

### ** * * AGENDA TRANSMITTAL FORM * * **

| **AGENDA ITEM:** | 4 (Continued) |
|---|---|

occur to at least some wells within the Laguna Seca subarea even if Cal Am discontinues all of its pumping from this subarea, and even if all Alternate Producers discontinue all of their pumping from this subarea.

The Watermaster Board will likely look to its TAC for recommendations on how to address these issues. Some potential recommendations are:

1. Pursue further modeling (as suggested in the Tech Memo) to better determine the impact of pumping from outside the eastern and southeastern boundaries of the Laguna Seca subarea.
2. Notify all Producers in the Laguna Seca subarea of the findings of HydroMetrics's modeling work.
2. Initiate the process of directing Alternate Producers in the Laguna Seca subarea to reduce pumping in order to mitigate the threat of material injury in this subarea.
3. Request that the Court provide direction with regard to reestablishing the boundaries of the Seaside Groundwater Basin to address the discrepancy between the original delineation of the Basin boundary in the vicinity of the Laguna Seca subarea, and the findings from this modeling work which indicate that the Basin boundary is further to the east and southeast in this area.

The TAC may not wish to make some or all of these recommendations to the Board, or there may be other recommendations the TAC would like to make. At today's meeting the TAC will be asked to determine what recommendations on this matter should be made to the Board.

| | |
|---|---|
| **ATTACHMENTS:** | HydroMetrics Technical Memorandum on the Laguna Seca Safe Yield Analysis (Draft version) |
| **RECOMMENDED ACTION:** | Provide input on what recommendations should be made to the Watermaster Board as a result of the HydroMetrics' modeling report |

519 17th Street, Suite 500
Oakland, CA 94612

# TECHNICAL MEMORANDUM

To: Mr. Bob Jaques

From: Stephen Hundt, Derrik Williams

Date: December 24, 2013

Subject: Results of Laguna Seca Safe Yield Analysis

Hydrometrics Water Resources Inc. (WRI) was tasked with determining impacts to the Laguna Seca subarea from potential pumping changes, and estimating the Natural Safe Yield and Operational Safe Yield of the subarea. This memorandum describes the results of each of the subtasks. These subtasks are:

- Subtask 1.1 – Estimate impacts if Cal-Am Discontinues Laguna Seca Pumping
- Subtask 1.2 – Estimate Laguna Seca subarea Natural Safe Yield
- Subtask 1.3 – Estimate Laguna Seca subarea Operational Safe Yield

## ESTIMATE IMPACTS IF CAL-AM DISCONTINUES LAGUNA SECA PUMPING

Subtask 1.1 involved selecting and running a baseline scenario that includes Cal-Am's discontinuing Laguna Seca pumping. The baseline scenario chosen for this analysis is the 25 Year Replenishment Scenario run as part of the Replenishment Repayment Modeling project, completed by Hydrometrics WRI in 2013.

Results of the baseline scenario were analyzed against two criteria:

1. Does ceasing Cal-Am pumping in the Laguna Seca subarea allow groundwater elevations to stabilize?
2. Will groundwater elevations drop below either the pump intake or the top of the screen in existing wells?

Hydrographs of predicted groundwater elevations from the baseline scenario are presented in Figure 1 through Figure 13. These figures also include well construction information, including the top of the screen and the pump intake elevation where available.

Pumping groundwater level data were provided by Monterey Peninsula Water Management District (MPWMD) for many wells. The difference between measured static water groundwater levels and measured pumping groundwater levels was used to estimate pumping drawdown in each well. For wells where pumping drawdown estimates are available, the predicted pumping groundwater level is included as a dashed blue line on Figure 1 through Figure 13.

The table of available well data is included as Table A3 in Appendix A. This information was combined with the model results to track how the simulated static and pumping water levels change over time, and to check whether these are predicted to drop into the screened interval or below the pump intake. A short explanation of missing data is noted on each of the hydrograph figures.

Table 1 summarizes the results of the baseline simulation for each well; noting whether or not the static or pumping water levels are predicted to fall below the screen top or the pump intake. Several wells do not have all of the information necessary to make these predictions. Of those that have the necessary information, groundwater levels in two wells – Bishop 3, and Ryan Ranch #7 - are predicted to drop below the top of the screen. Only the Laguna Seca Resort Raceway well is predicted to see static water levels drop below the top of the screen. No wells with known pump intake elevations are predicted to have static or pumping water levels drop below the pump intake.

## Table 1: Summarized Results for Select Wells

| Well | Static Water Level | | Pumping Water Level | |
|---|---|---|---|---|
| | Drops Below Screen Top | Drops Below Pump Intake | Drops Below Screen Top | Drops Below Pump Intake |
| Bay Ridge | N | N | N | N |
| Bishop #1 | N | N | N | N |
| Bishop #3 | N | n/a | Y | n/a |
| Pasadera – Paddock | N | N | N | N |
| Pasadera – Main Gate | N | n/a | N | n/a |
| Ryan Ranch #7 | N | N | Y | N |
| Ryan Ranch #8 | N | N | n/a | n/a |
| Ryan Ranch #11 | N | N | N | N |
| Laguna Seca Golf Resort New #12 | N | N | N | N |
| Laguna Seca Golf Resort Racetrack | Y | n/a | n/a | n/a |
| Toro #3 | n/a | n/a | n/a | n/a |
| Laguna Seca Recreation Area #1 | n/a | n/a | n/a | n/a |
| Laguna Seca Recreation Area #2 | N | n/a | n/a | n/a |

Y = yes, N = no, n/a = not available

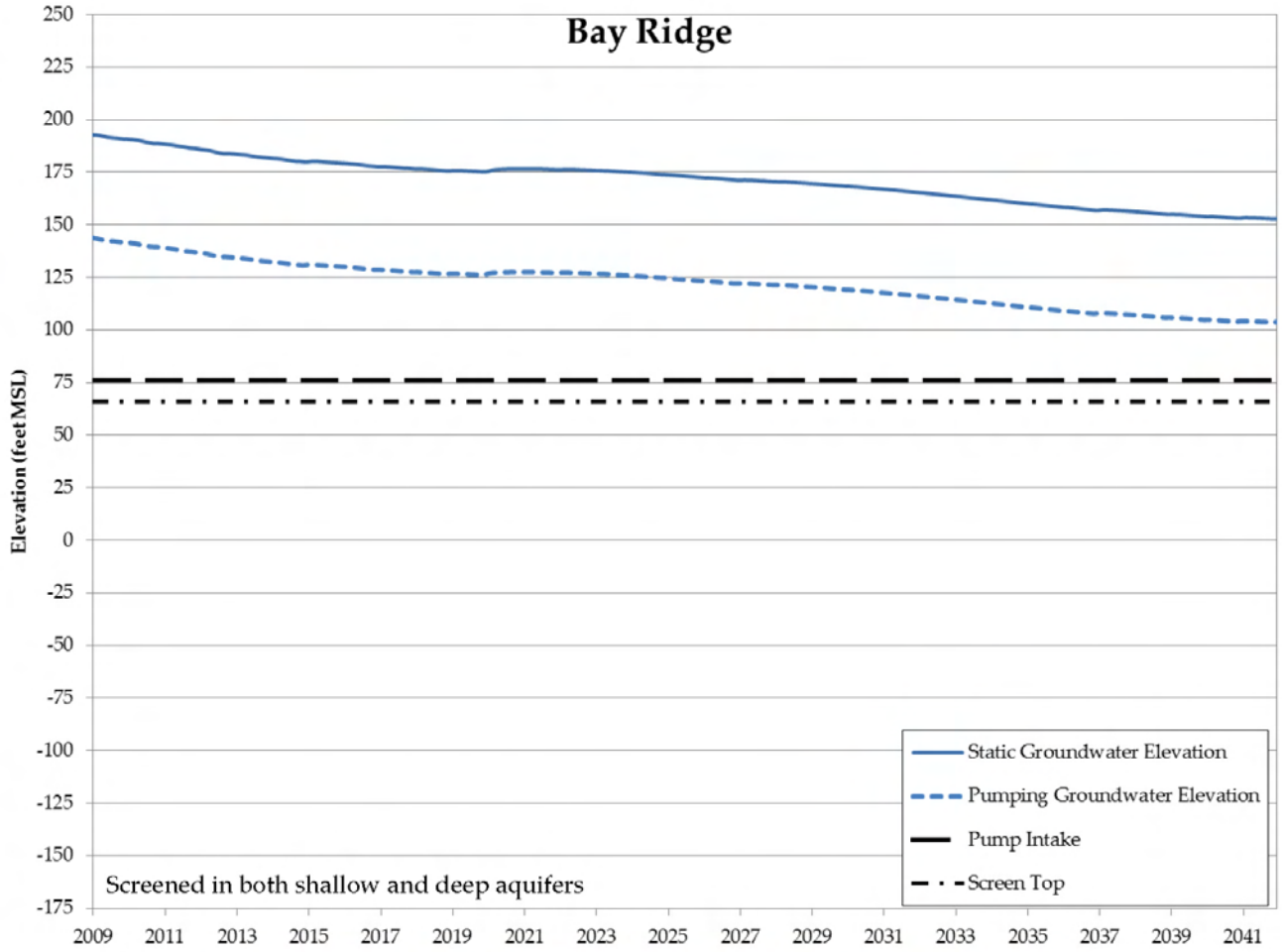


**Figure 1: Bay Ridge Baseline Scenario Static and Pumping Hydrograph**

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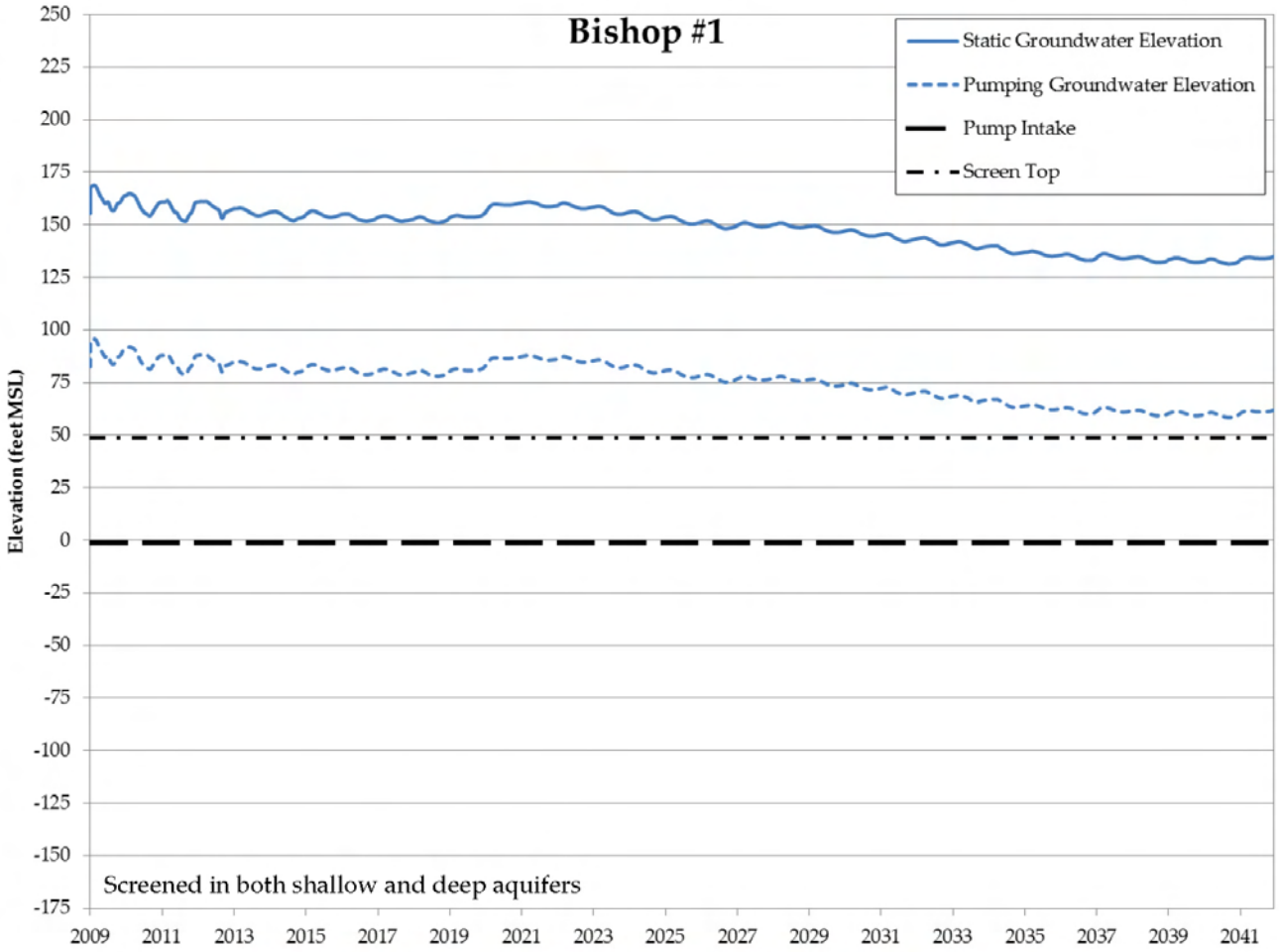


**Figure 2: Bishop #1 Baseline Scenario Static and Pumping Hydrograph**

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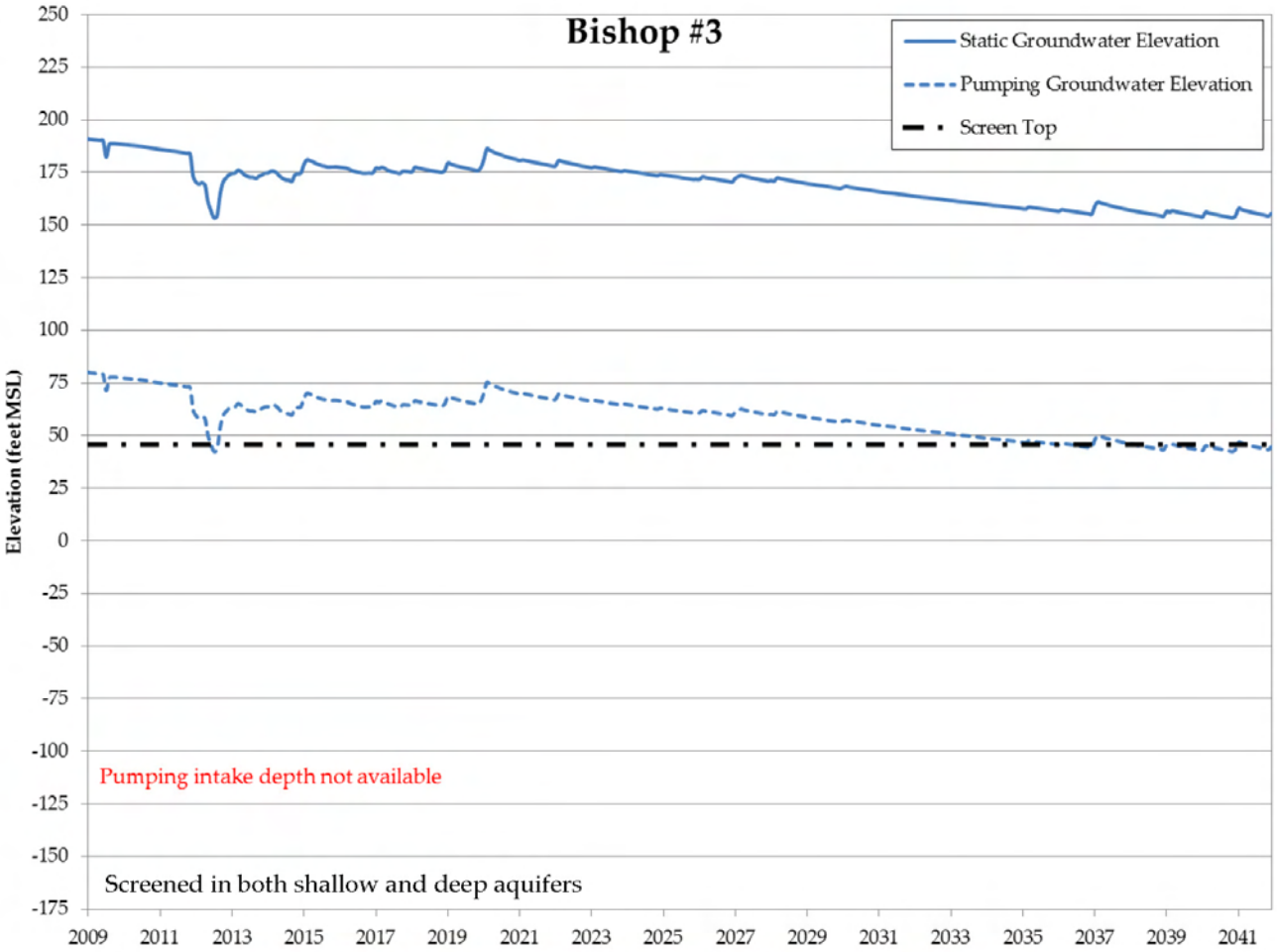


**Figure 3: Bishop #3 Baseline Scenario Static and Pumping Hydrograph**

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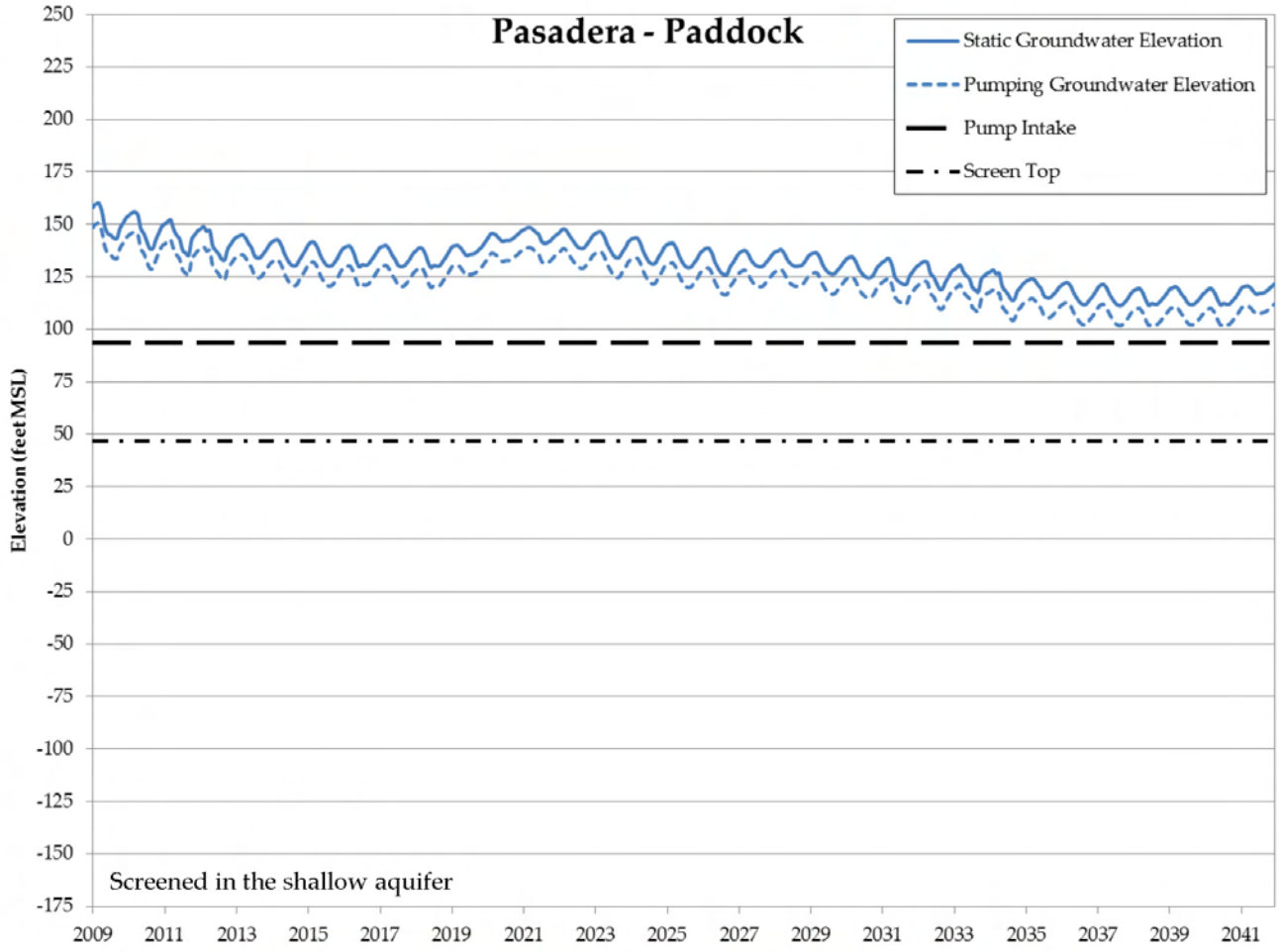


**Figure 4: Pasadera Paddock Baseline Scenario Static and Pumping Hydrograph**

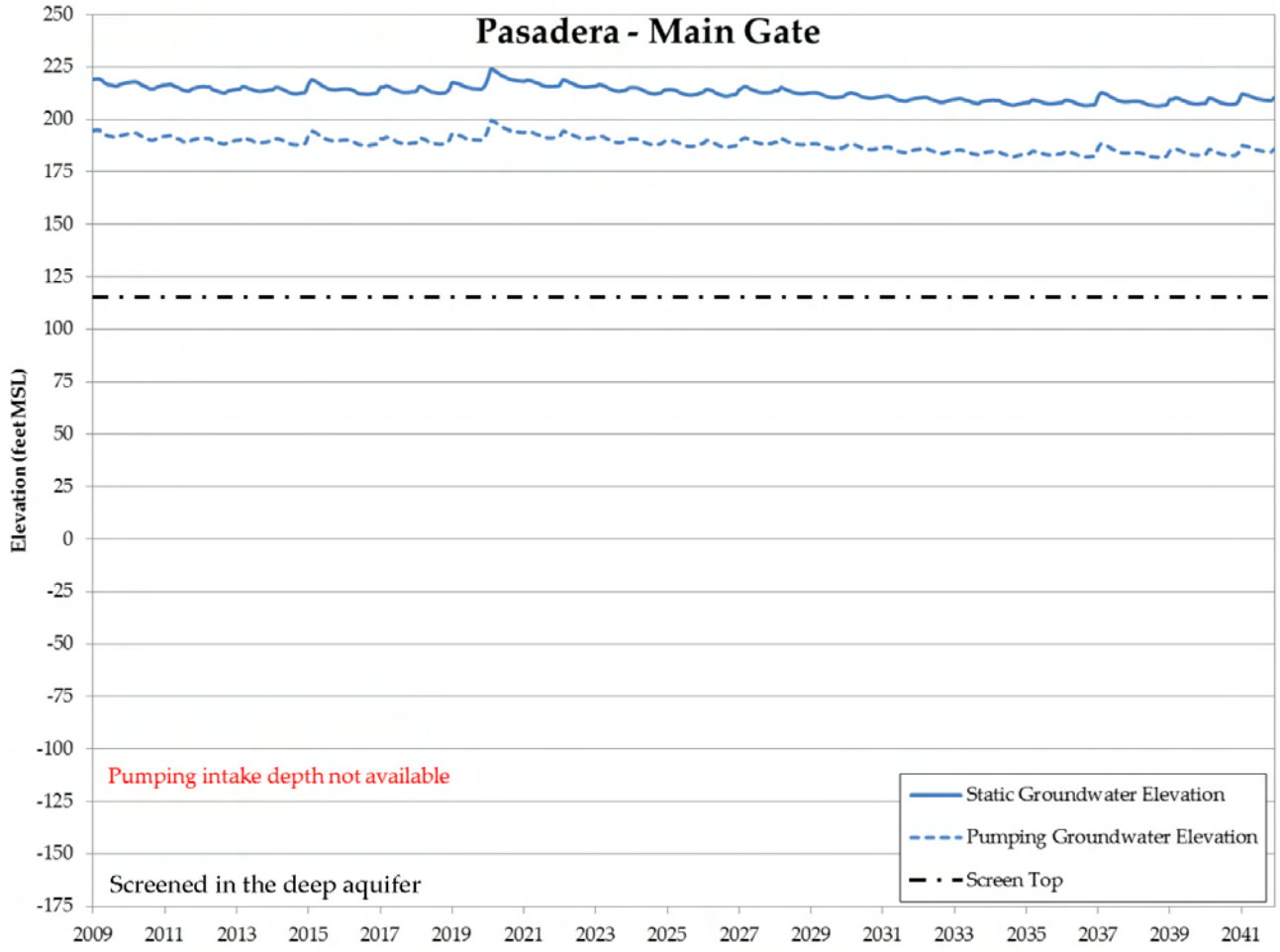


**Figure 5: Pasadera Main Gate Baseline Scenario Static and Pumping Hydrograph**

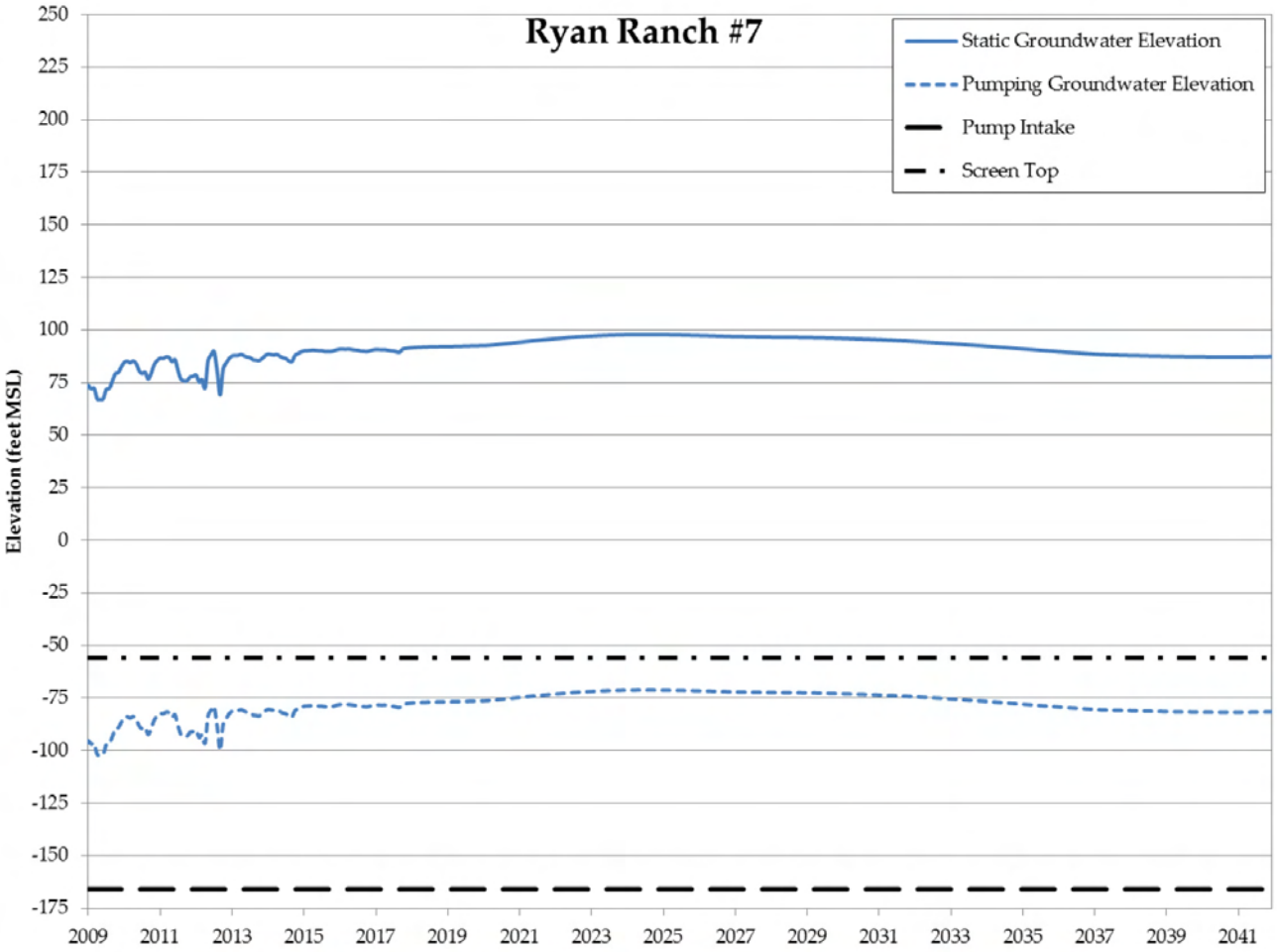


**Figure 6: Ryan Ranch #7 Baseline Scenario Static and Pumping Hydrograph**

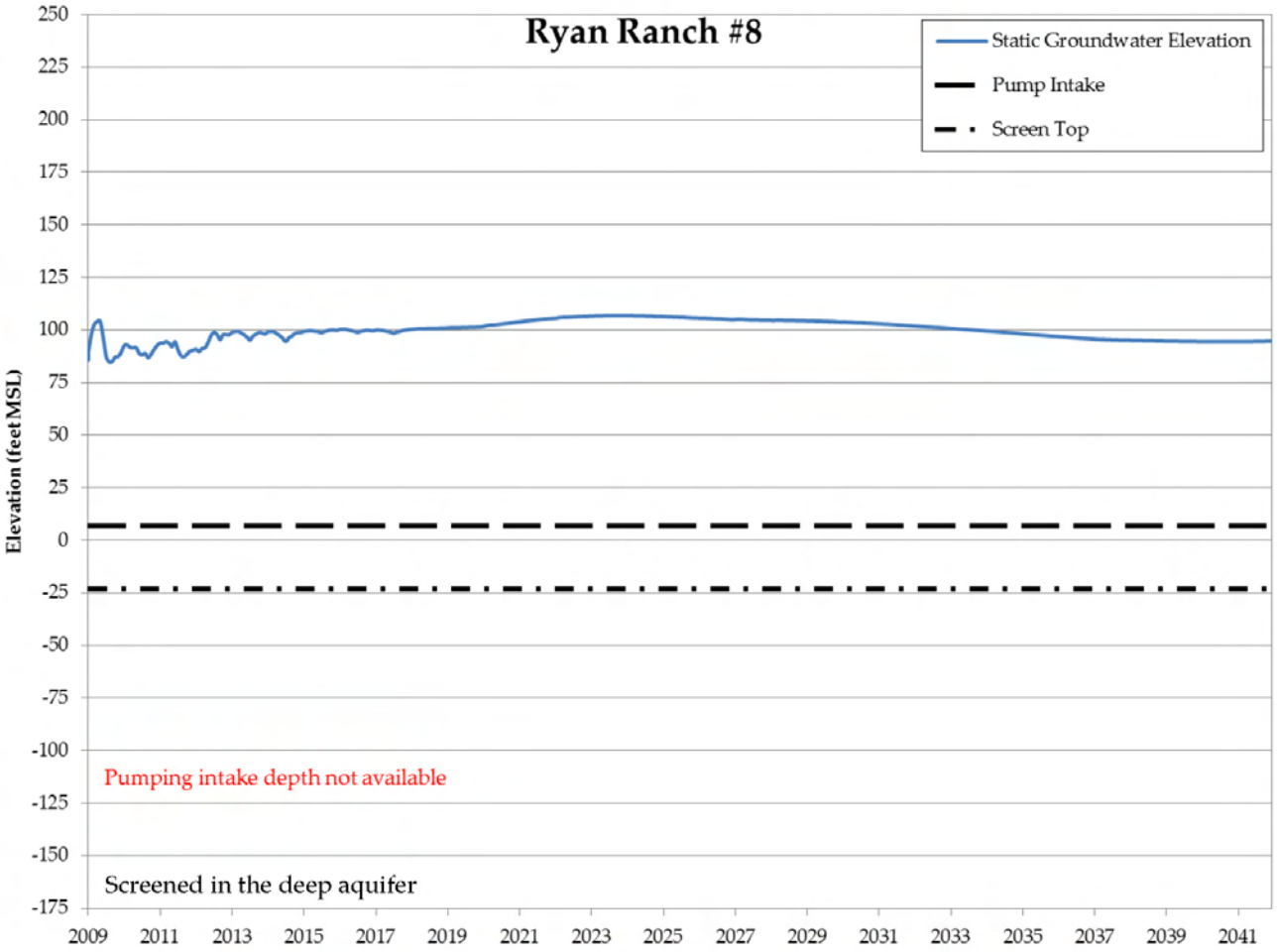


**Figure 7: Ryan Ranch #8 Baseline Scenario Static and Pumping Hydrograph**

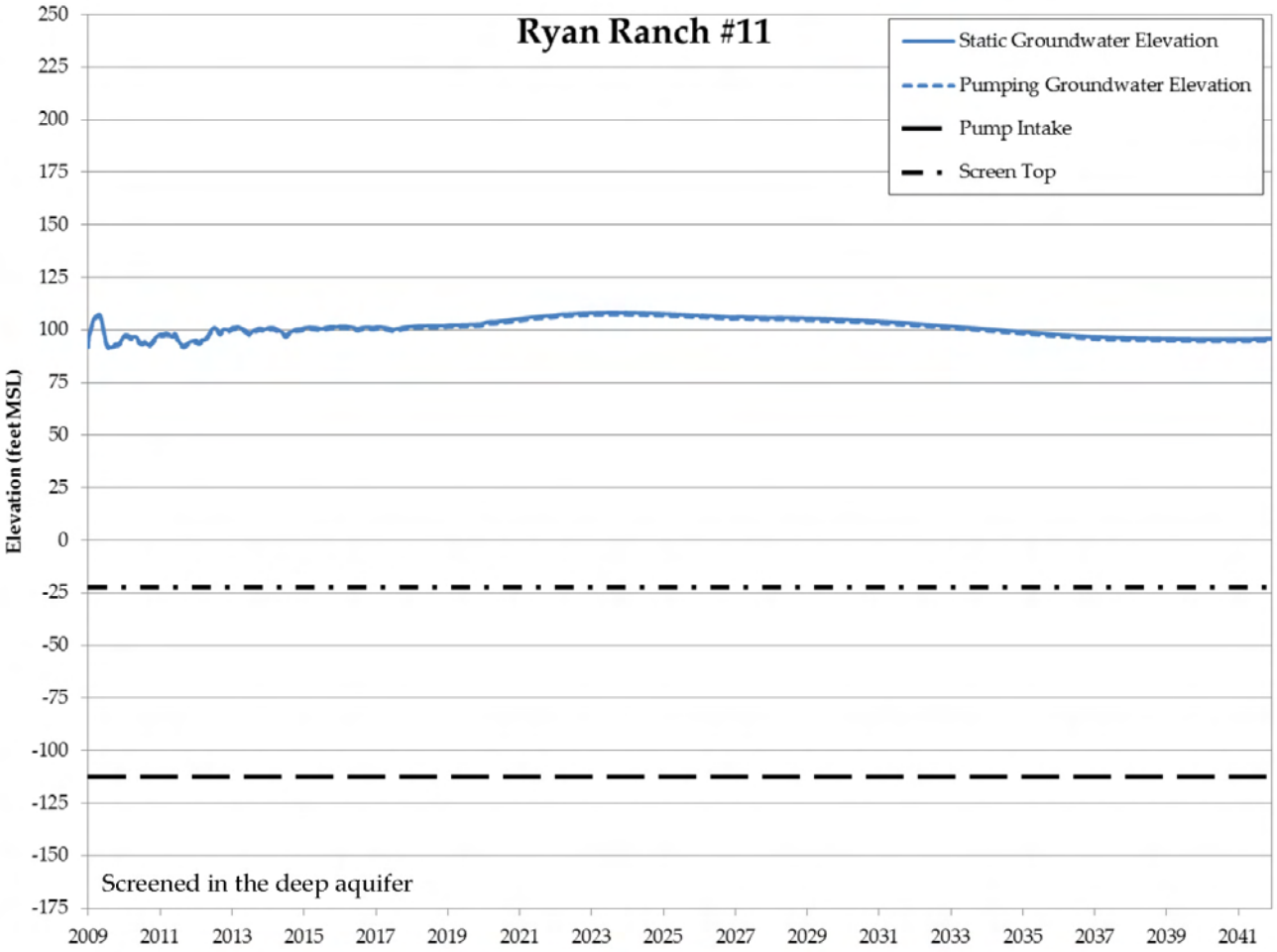


**Figure 8: Ryan Ranch #8 Baseline Scenario Static and Pumping Hydrograph**

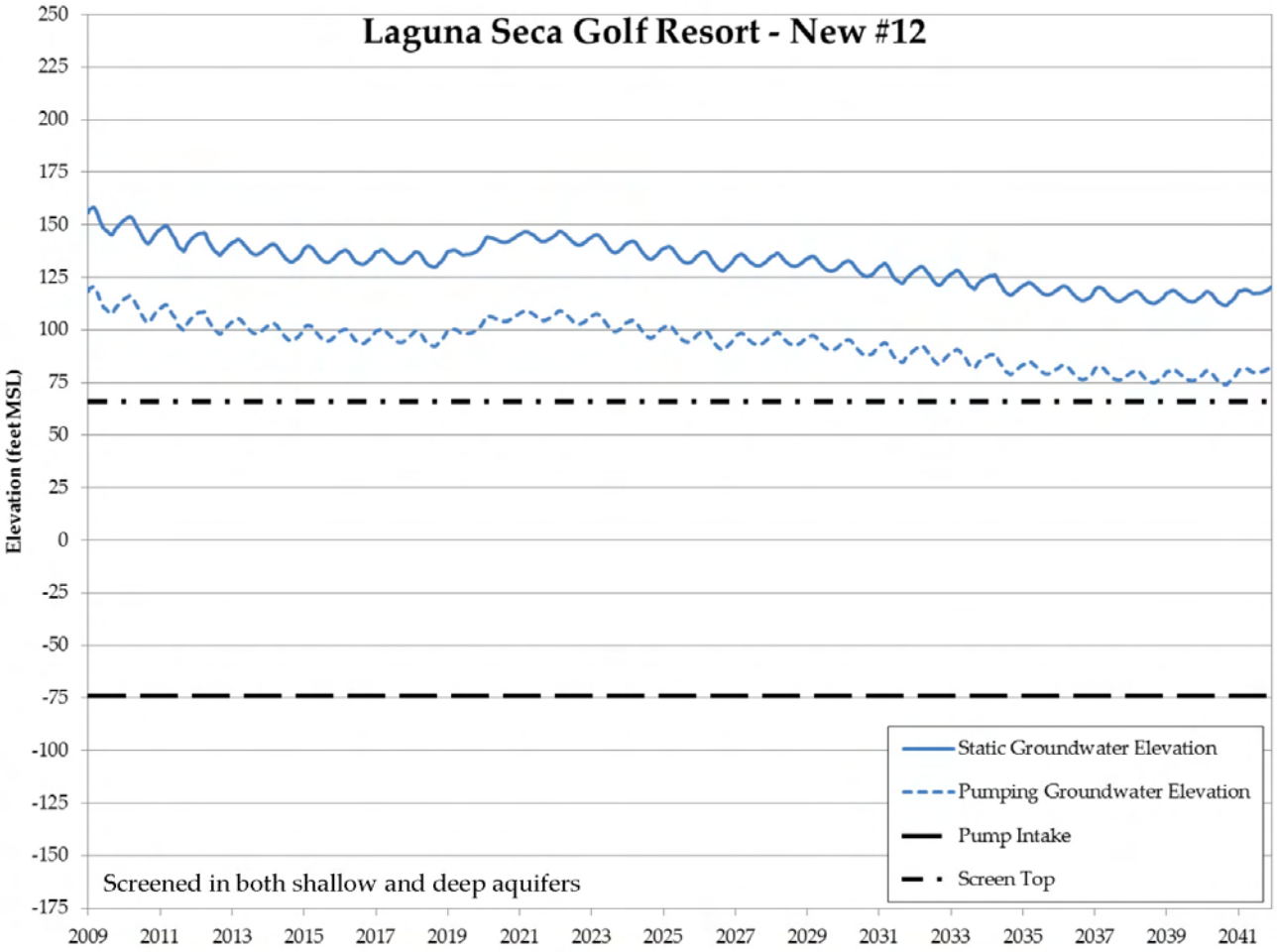


**Figure 9: Laguna Seca Resort New 12 Baseline Scenario Static and Pumping Hydrograph**

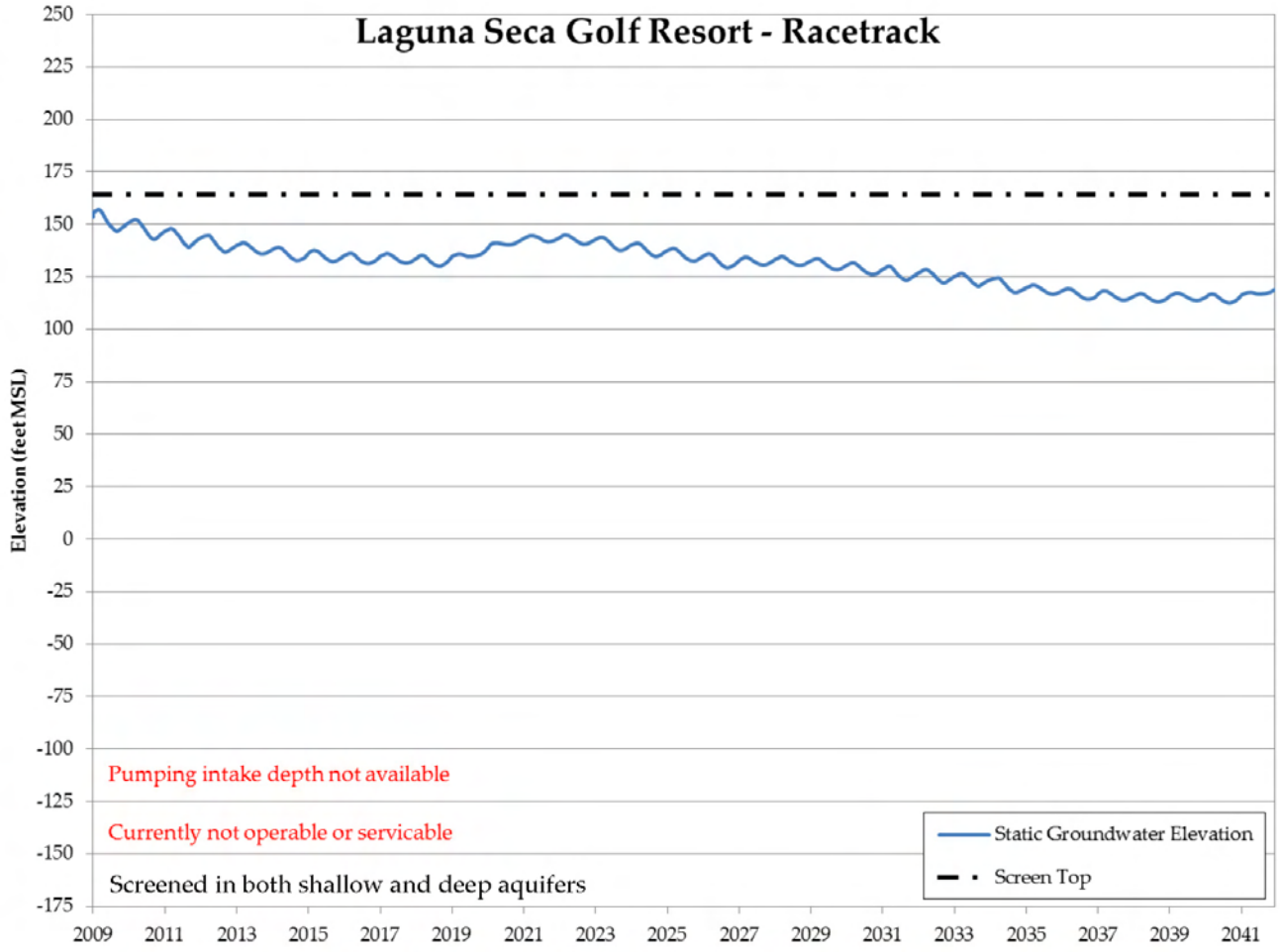


Figure 10: Laguna Seca Resort Racetrack Baseline Scenario Static and Pumping Hydrograph

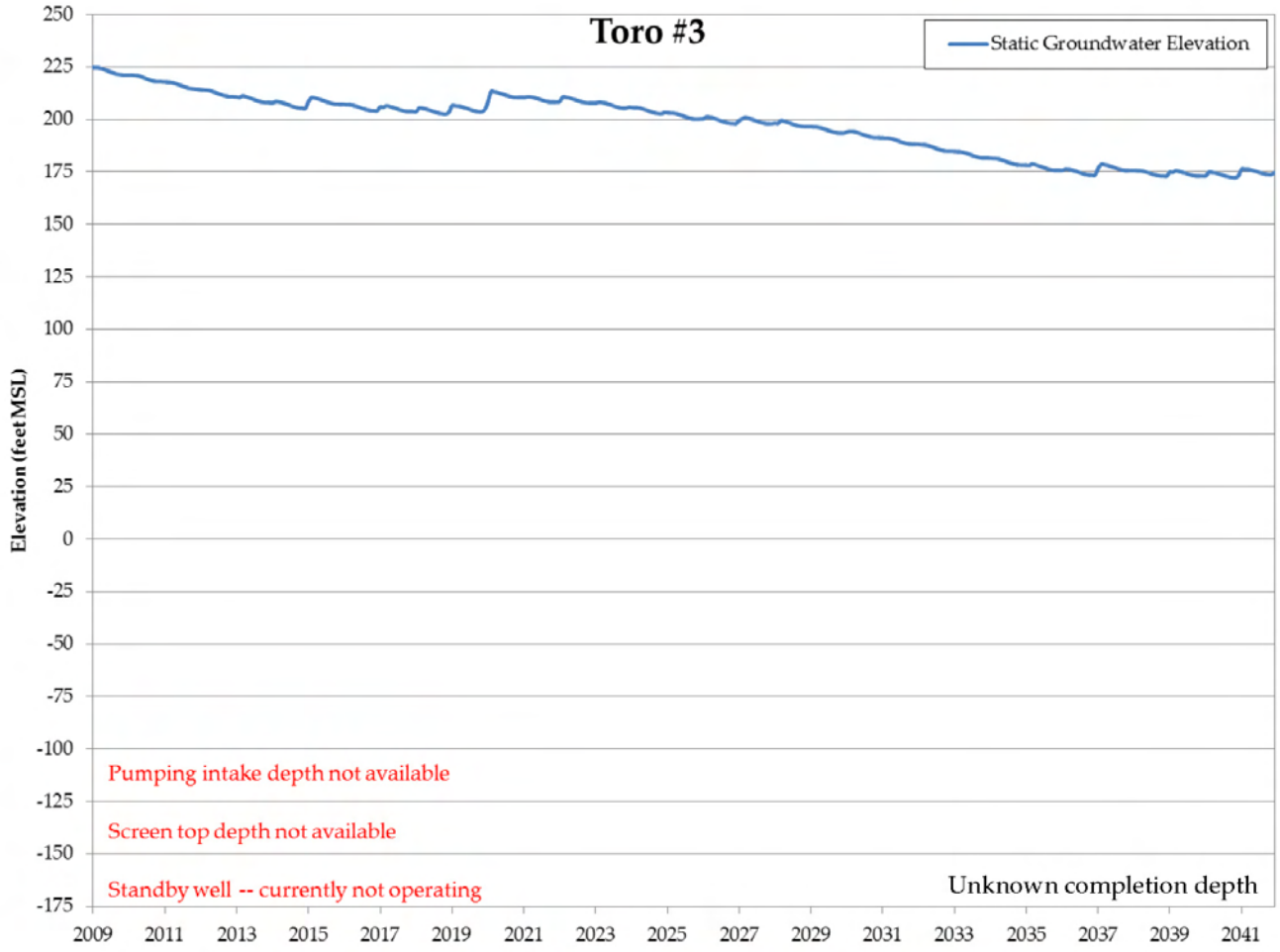


**Figure 11: Toro #3 Baseline Scenario Static and Pumping Hydrograph**

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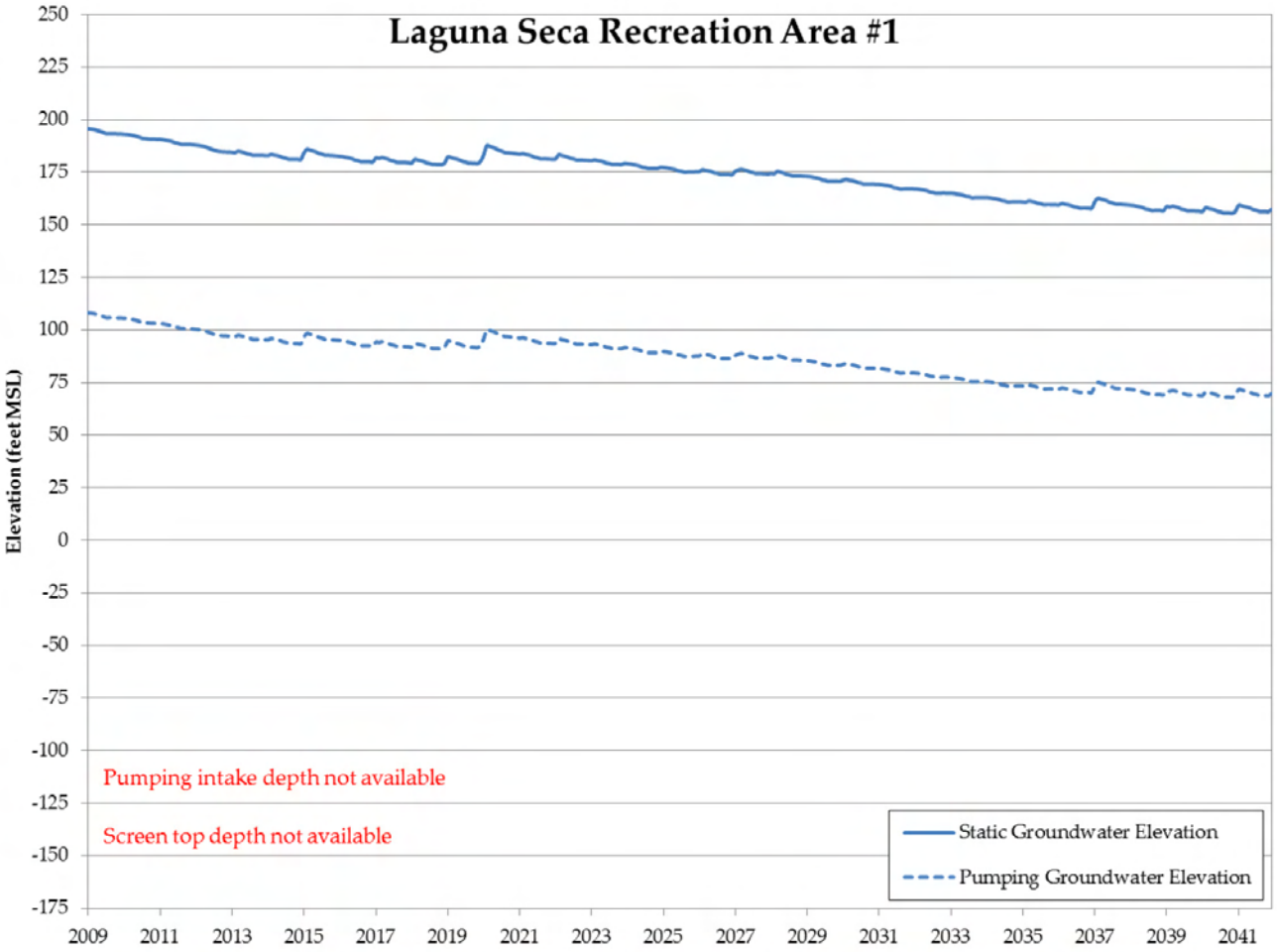


**Figure 12: Laguna Seca Recreation Area #1 Baseline Scenario Static and Pumping Hydrograph**

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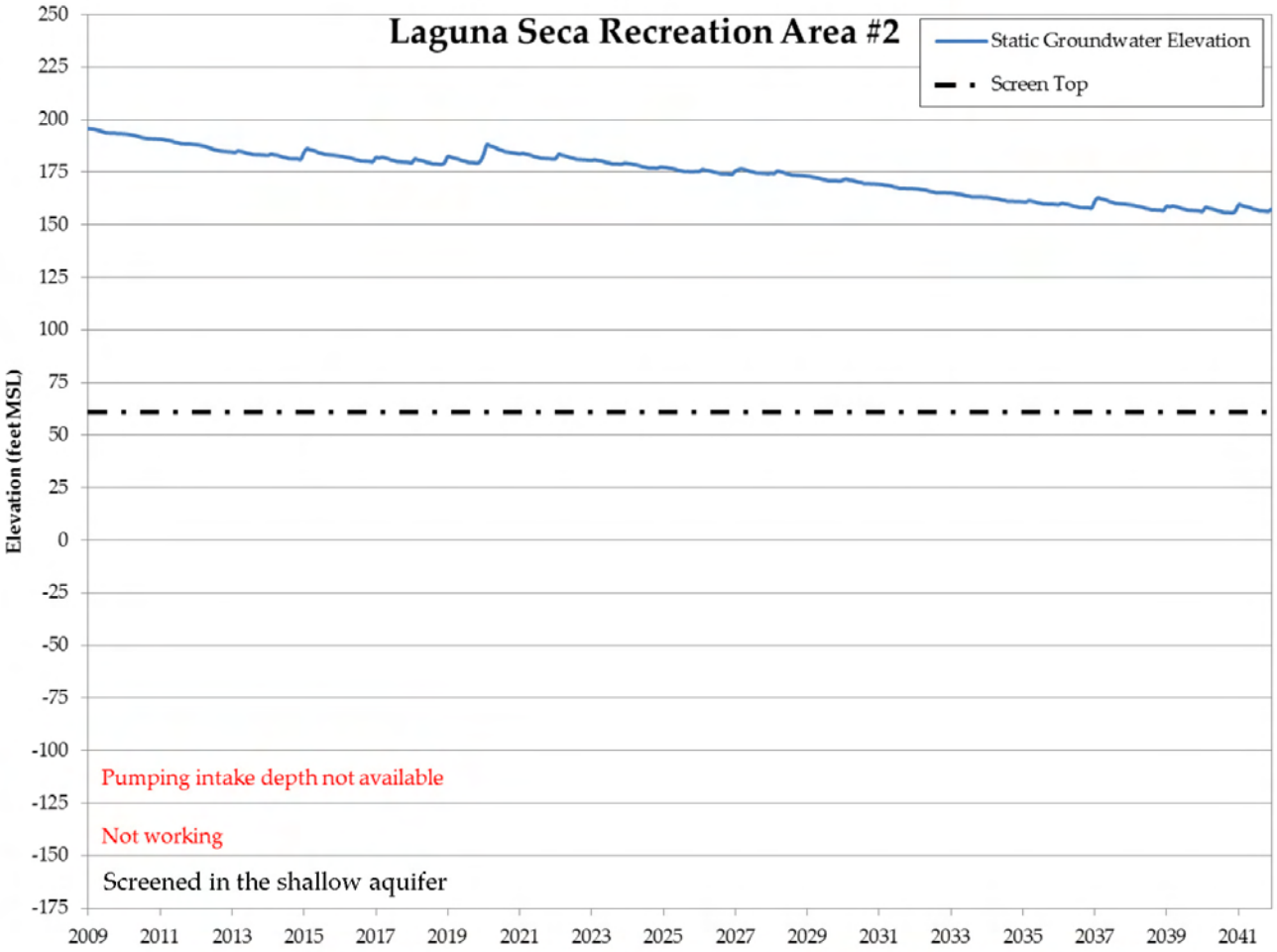


**Figure 13: Laguna Seca Recreation Area #2 Baseline Scenario Static and Pumping Hydrograph**

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## ESTIMATE LAGUNA SUBAREA SECA NATURAL SAFE YIELD

The results obtained from the baseline scenario flow model simulation were used to calculate the natural safe yield. The natural safe yield is the amount of groundwater recharge and subsurface inflow that could be pumped while maintaining necessary streamflows and subsurface outflows to neighboring basins.

The only stream leaving the Laguna Seca subarea is the Arroyo del Rey. Groundwater elevations are currently below the bottom of the Arroyo del Rey, and therefore lowering groundwater elevations do not result in any additional loss of streamflow (MPWMD, personal communication). Therefore, changes to required streamflows were ignored when calculating the natural safe yield. The natural safe yield was calculated with the formula:

$$\textit{Natural Safe Yield} = \textit{Aerial Recharge} + \textit{Subsurface Inflow} - \textit{Subsurface Outflow}$$

The values used for aerial recharge and subsurface inflow were the average annual values simulated in the baseline scenario. Similarly, the required subsurface outflow is the average annual subsurface outflow simulated in the baseline scenario.

The simulated average annual aerial recharge in the Laguna Seca subarea simulated is 866 acre-feet per year. The simulated average annual subsurface inflow into the Laguna Seca subarea is 930 acre-feet per year. The simulated average annual subsurface outflow from the Laguna Seca subarea is 1,556 acre-feet per year. Applying these values to the formula above, the average annual natural safe yield is 240 acre-feet per year.

The results of the natural safe yield calculation for every water year and for an average year are shown on Figure 14. The chart shows the annual rates in acre-feet per water year for each of the components of the natural safe yield. Aerial recharge is shown in blue, the subsurface inflow in green, the subsurface outflow in red, and the resulting annual natural safe yield is shown in gray. In addition, the average annual natural safe yield of 240 acre-feet per year is shown as the dashed black line. The annual values for each component of the natural safe yield are tabulated in Table A1 in Appendix A. Additionally, the annual pumping and

changes in storage, which complete the water budget for the Laguna Seca subarea are tabulated with the natural safe yield in
Table A2.

The Laguna Seca subarea is currently subject to the adjudication Decision natural safe yield value of 608 acre feet per year. There have been several studies that arrive at safe yield values for the Seaside Basin and Laguna Seca subarea (Yates 2002, CH2M Hill 2004), yet the methodology and data used to arrive at the adjudicated 608 acre feet per year is not stated in any of these reports. This value is two and a half times larger than the 240 acre feet per year natural safe yield that this study estimates. However, since the methodology used to develop the 608 acre feet per year figure is unknown, it was not possible to make a side-by-side comparison to determine the causes of the difference.

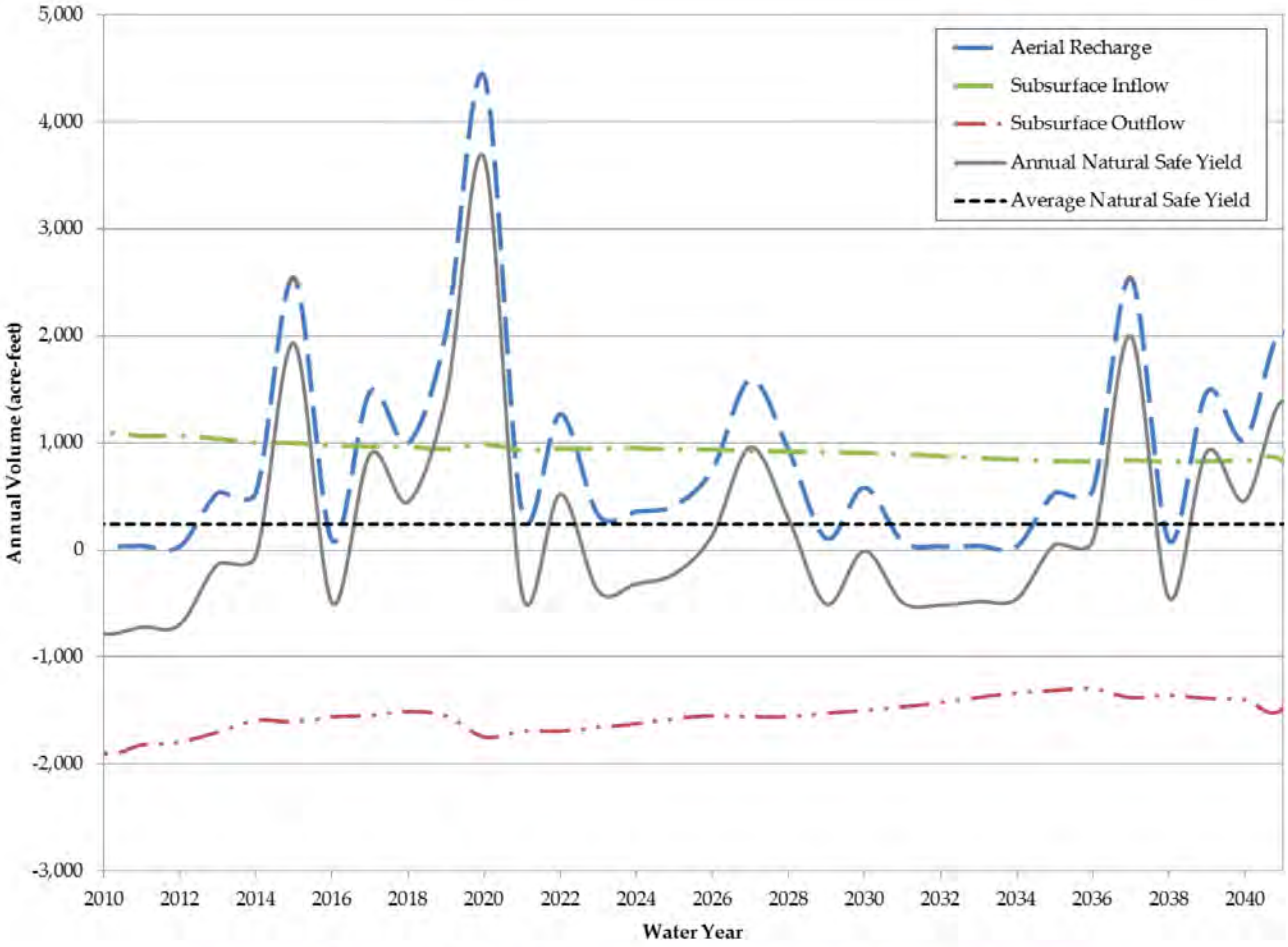


**Figure 14: Annual Natural Safe Yield Components for the Baseline Scenario**

## ESTIMATE LAGUNA SECA SUBAREA OPERATIONAL SAFE YIELD

The approach adopted in the natural safe calculation treats the entire basin as an isolated reservoir in which all inputs and outputs are distributed uniformly over its geographic area and throughout time. Ideally, pumping at the natural safe yield results in a stable water balance for the subarea. However, there is both spatial and temporal variability in the inputs and outputs of water to the subarea, and this prevents the natural safe yield from providing a stable water balance.

Initially, for this task, the operational safe yield for the Laguna Seca subarea was to be estimated based on a pumping rate that can be sustained by Standard and Alternative producers, and meets the criteria below. However, as the first and second criterion could not be met, the third criterion was not considered further.

1) Groundwater levels in existing wells stabilize, and do not persistently and continuously decline,
2) Pumping groundwater levels remain above the well pump intake and top of screen for each well, and
3) Existing subsurface outflows determined from the natural safe yield calculations are maintained.

The operational safe yield acknowledges constraints imposed by the locations of existing wells, as well as the spatial and temporal variability in recharge and discharge. The operational safe yield is therefore the amount of groundwater that can be pumped from existing wells without unwanted detrimental effects. The operational safe yield was estimated through iterative model runs.

The first criterion of maintaining stable groundwater levels in existing wells was evaluated by graphing simulated hydrographs from a number of wells throughout the basin. Hydrographs were produced for three simulations: 1) the baseline simulation, 2) a scenario in which pumping is reduced to the previously calculated natural safe yield of 240 acre-feet per year, and 3) for the most severe pumping reduction possible – dropping all Standard and Alternative producer pumping to zero. The hydrographs are shown on Figure 15 through Figure 17. As noted on the hydrographs, these wells are screened in both the Paso Robles (shallow) and Santa Margarita (deep) aquifers. The pumping rates for each of these scenarios are summarized in Table 2.

### Table 2: Laguna Seca Subarea Average Annual Pumping Rates by Producer

| | Average Annual Pumping (AF/year) | | |
|---|---|---|---|
| | **Baseline Scenario** | **Natural Safe Yield Scenario** | **No Standard or Alternative Pumping Scenario** |
| Standard Producers | 36 | 0 | 0 |
| Alternative Producers | 480 | 240* | 0 |
| Private Producers** | 8 | 8 | 8 |
| Standard + Alternative | 516 | 240 | 0 |
| All Producers | 524 | 248 | 8 |

* Lowering the total annual production from Alternative Producers to this level would require reducing Alternative Producers to reduce their current levels of pumping by 240 acre-feet per year.

** Private producers are: Shoreline Community Church - Merrill Trust, SPCA, Stolich, and Wayland (formerly Fowler).

Figure 15 through Figure 17 show that groundwater levels do not stabilize at several wells, even under the most extreme pumping reductions. Figure 18 shows the locations of the wells, in addition to the locations of pumping wells in and near the Laguna Seca subarea that are active in the baseline scenario.

Hydrographs from the baseline scenario, in which Cal-Am pumping in the Laguna Seca subarea ceases in 2018, are plotted on Figure 15. Groundwater levels in wells FO-4 and Ryan Ranch #7 (RR-7) stabilize in this scenario. Groundwater levels in wells FO-6 Shallow, FO-6 Deep, Bishop1, and LS Driving Range (SCS-Deep) continue to decline in this scenario. The two wells with stable hydrographs are the two westernmost wells included on Figure 15.

Hydrographs from the second scenario, in which Laguna Seca subarea pumping is set to the estimated natural safe yield of 240 acre-feet per year, are plotted on Figure 16. Groundwater levels in the westernmost wells, FO-4 and RR-7, stabilize in this scenario. Groundwater levels in wells from the middle of the Laguna Seca subarea, Bishop1 and LS Driving Range (SCS-Deep), continue to decline, although at a slower rate than observed in the baseline scenario. Groundwater levels in the easternmost wells, FO-6 Shallow and FO-6 Deep continue to decline in this scenario at rates similar to, although slightly slower than, rates observed in the baseline scenario.

Hydrographs from the third scenario, in which all Standard producer and Alternative producer pumping from the Laguna Seca subarea is halted, are plotted on Figure 17. Groundwater levels in wells in the western and middle portions of the Laguna Seca subarea either stabilize or rise in this scenario. This includes groundwater levels in wells FO-4, RR-7, Bishop1 and LS Driving Range (SCS-Deep). Groundwater levels in the easternmost wells, FO-6 Shallow and FO-6 Deep continue to decline in this scenario, although the decline is slower than rates observed in the baseline scenario.

Hydrographs shown on Figure 15 through Figure 17 suggest that reducing pumping helps a number of wells to stabilize or recover; but a few wells on the eastern side of the basin continue to decline. The inability of some wells to achieve stable groundwater levels is apparently due to the amount of pumping from wells located outside of the Laguna Seca subarea, but near its eastern boundary. Figure 18 includes the locations of pumping wells located outside the eastern boundary of the Laguna Seca subarea. The Toro-1, Toro-2, and Toro-3 wells shown on Figure 18 are close to, but officially outside of the Laguna Seca subarea boundary. This finding suggests that either the original boundary in this portion of the Seaside Basin was incorrectly drawn, or the boundary has shifted to the east due to changes in pumping practices.

Figure 19 displays wells inside, and just outside the eastern boundary of, the Laguna Seca subarea under the baseline scenario. The wells just outside and east of the Laguna Seca subarea, which are listed in Table 3, pump roughly twice as much as all of the wells within the Laguna Seca subarea. A breakdown of the average annual pumping rates by well is shown in this table. Some of these production wells, such as Toro 1, 2 and 3 wells, lie extremely close to the subarea boundary and close to the easternmost monitoring well (FO-6). Well FO-6 is the well that shows the largest and most persistent groundwater level declines under all scenarios.

The pumping variability observed on Figure 19 results from the scenario's pumping assumptions. The baseline pumping scenario begins by replicating 3½ years of recorded rates. After this initial period, the pumping switches to estimated future pumping rates. Included in the estimated future pumping rates are wells with constant annual pumping rates and wells (primarily golf course irrigation wells) that have variable pumping rates that are tied to the hydrology

that is applied to the simulation period of the model. The golf course irrigation wells in this part of the basin drive the annual variability seen in Figure 19.

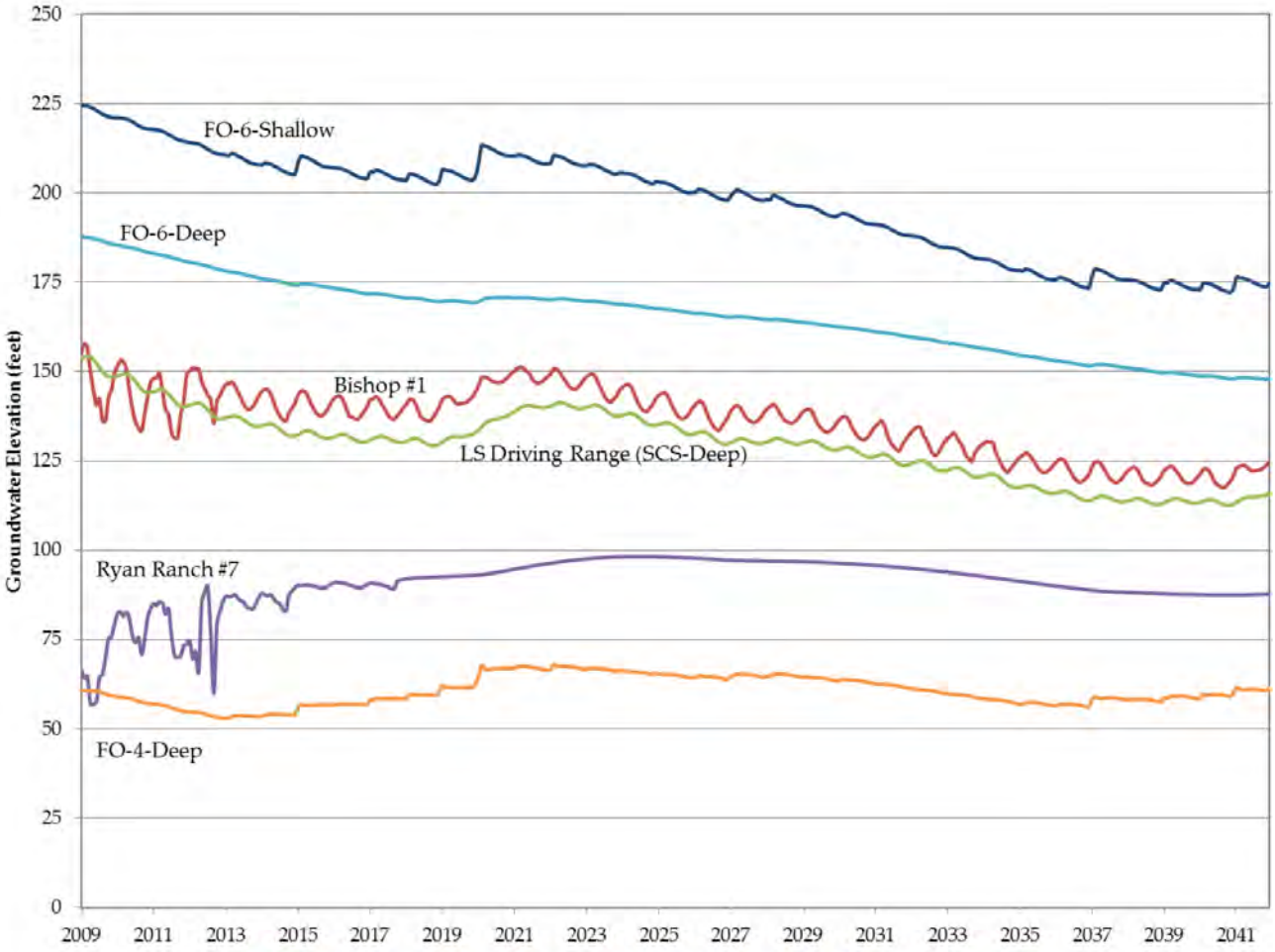


**Figure 15: Hydrographs of Selected Wells Under the Baseline Scenario**

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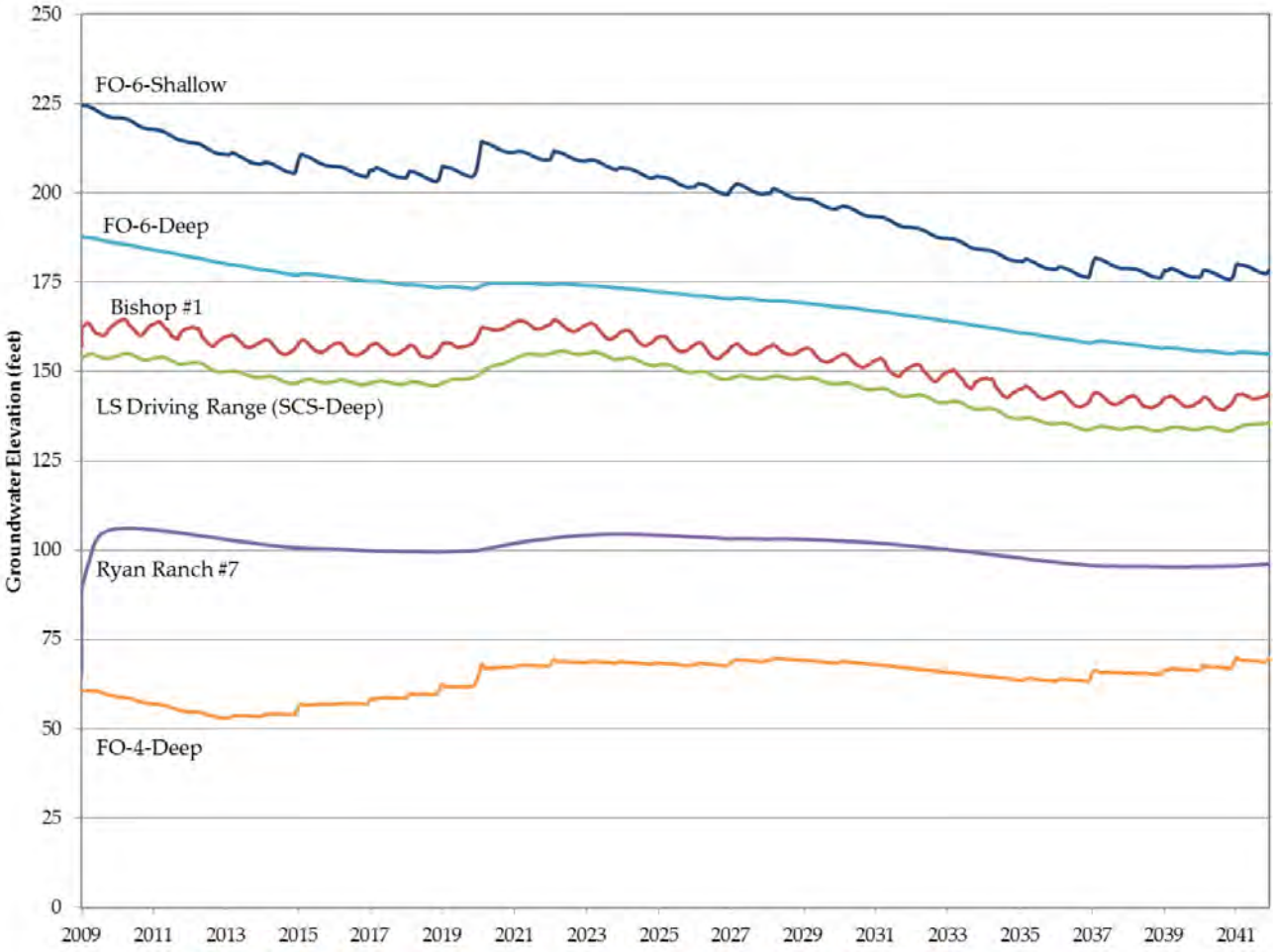


**Figure 16: Hydrographs of Selected Wells Under the Natural Safe Yield Scenario**

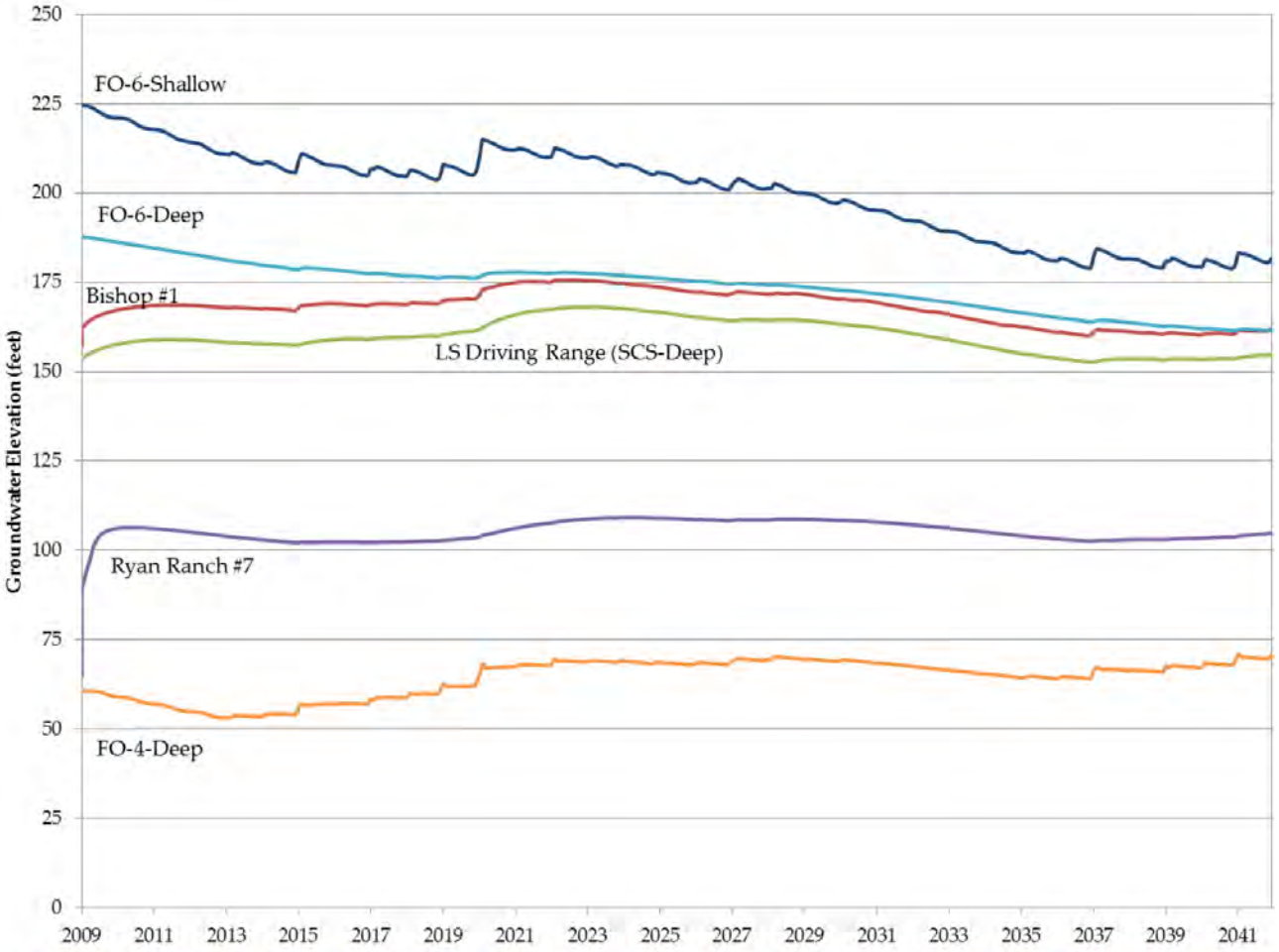


**Figure 17: Hydrographs of Selected Wells under the No Standard or Alternative Producer Pumping Scenario**

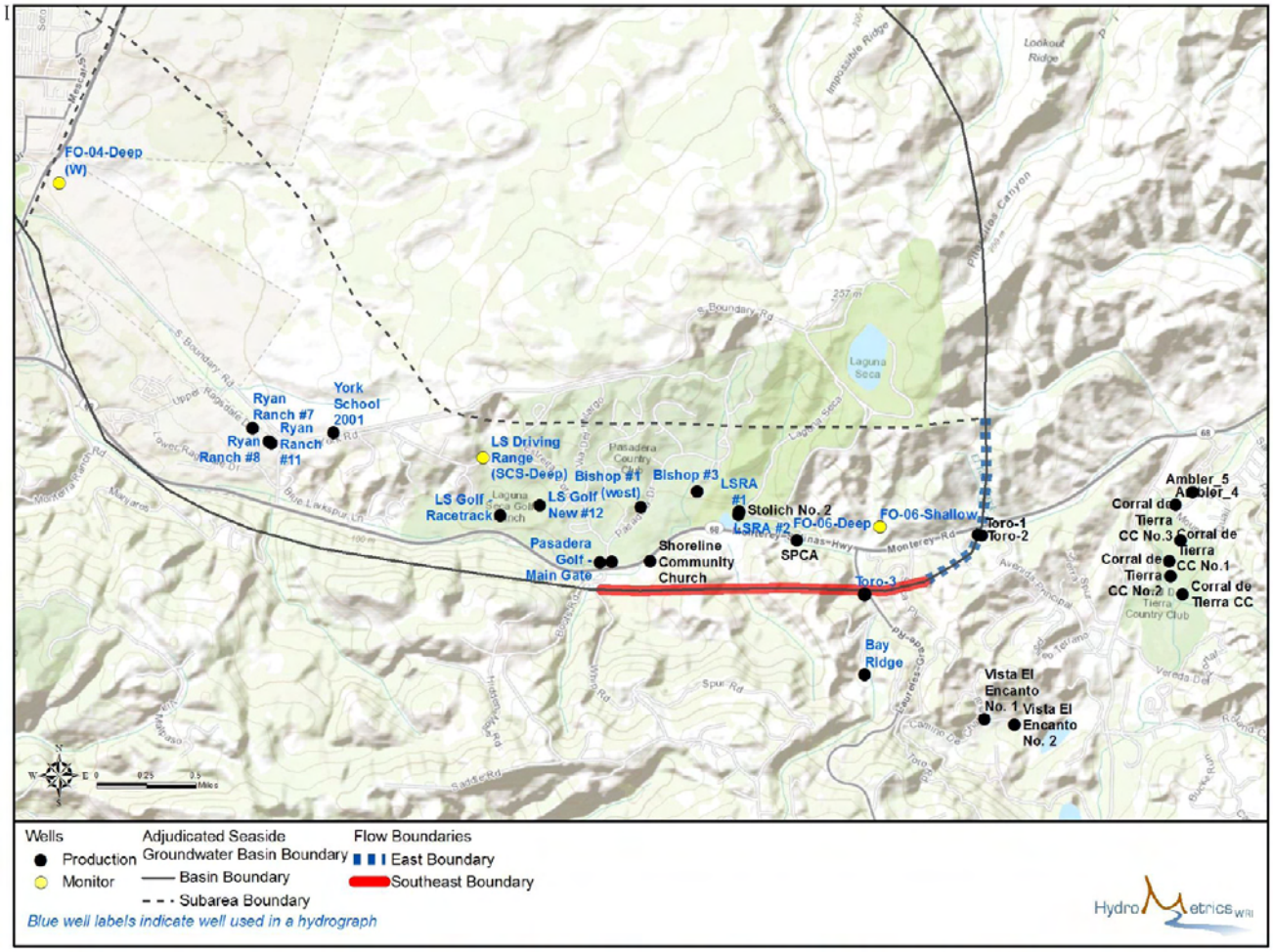


**Figure 18: Locations of Laguna Seca Flow Boundaries, Wells with Plotted Hydrographs, and Active Pumping Wells**

## Table 3: Baseline Scenario Pumping Rates Outside of the Laguna Seca Subarea, but Near its Eastern Boundary

| Well | Average Annual Pumping (AF) |
|---|---|
| Ambler_4 | 2 |
| Ambler_5 | 185 |
| Bay_Ridge | 24 |
| Corral_de_Tierra_CC_No_1 | 64 |
| Corral_de_Tierra_CC_No_2 | 64 |
| Corral_de_Tierra_CC_No_3 | 64 |
| Corral_de_Tlerra_CC | 64 |
| Tierra_Meadows_No_1 | 105 |
| Tierra_Meadows_No_2 | 105 |
| Toro-1 | 128 |
| Toro-2&3 | 101 |
| Vista_El_Encanto_No_1 | 105 |
| Vista_El_Encanto_No_2 | 105 |
| All Eastern Boundary Wells | 1,117 |
| | |
| All Laguna Seca Wells | 526 |

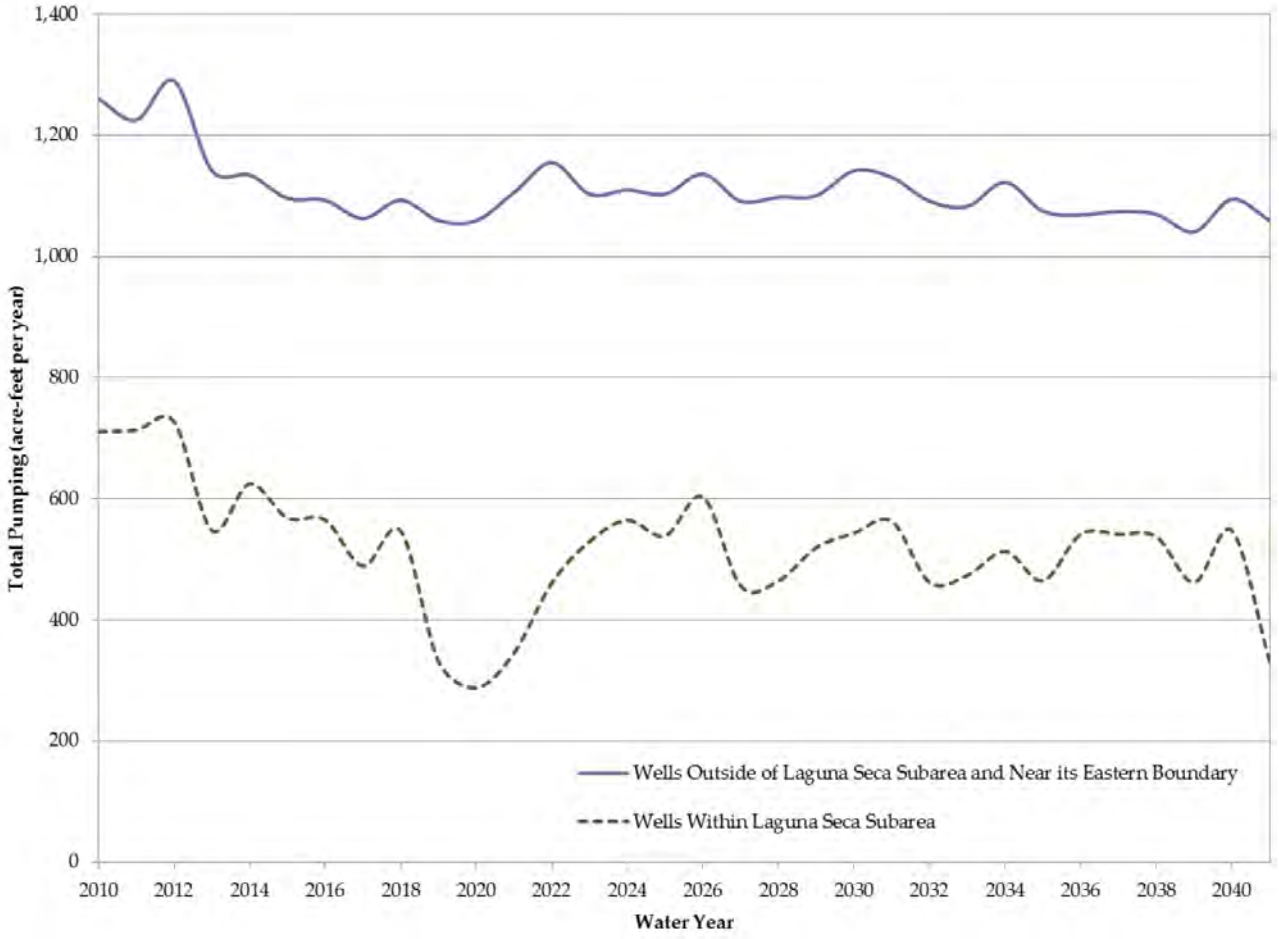


Figure 19: Baseline Scenario Pumping Rates within the Laguna Seca Subarea and Near its Eastern Boundary

The amounts of groundwater flowing in and out of the Laguna Seca subarea are additional pieces of evidence that shed light on the dynamics of the aquifer system. Specifically, the relationship between boundary flows and pumping helps explain why the Laguna Seca subarea appears to be unable to achieve stable groundwater elevations.

To examine the flows that take place near the eastern boundary, the eastern boundary was divided into an eastern segment and a southeastern segment. The locations of these segments are shown on Figure 18. The total amount of groundwater that flows across each boundary segment during every year of the simulation period was then extracted from the model results.

The annual flows across the eastern and southeastern boundary are shown on Figure 20. On this figure the solid lines are boundary flows under the baseline scenario, and the dashed lines are boundary flows under the no Laguna Seca pumping scenario. Positive values indicate that flow is entering the Laguna Seca subarea from the adjacent basin and negative values indicate that flow is exiting the Laguna Seca subarea. Figure 20 shows that groundwater flows into the subarea across the southeastern boundary and that groundwater flows out of the subarea across the eastern boundary.

When both Standard and Alternative producer pumping is reduced to zero, groundwater levels in the Laguna Seca subarea are higher, so less groundwater flows into the subarea from the southeast, and more groundwater flows out of the subarea to the east. Figure 21 shows the annual differences in flows between the two scenarios for each boundary segment.

The changes observed on this figure are consistent with the observation that groundwater elevations in the Laguna Seca subarea, while not recovering entirely, are higher in the scenario with no Standard or Alternative producers pumping than in the baseline scenario. The flow out of the subarea along the eastern boundary, for example, is driven by the groundwater levels in the Laguna Seca subarea being higher than water levels to the east. As groundwater levels in the Laguna Seca subarea rise, the gradient from the Laguna Seca subarea to the east increases and drives more water out of the subarea.

Overall, this analysis highlights the difficulty that can arise when trying to manage only a subset of an aquifer system when that subset is fully integrated

with the system surrounding it. In the case of the Laguna Seca subarea, the surrounding system contains several wells that appear to have a direct influence on the conditions that exist within the subarea. This influence is beyond the control of the Watermaster and draws into question the ability of establishing an operational safe yield for the Laguna Seca subarea as defined in the memorandum.

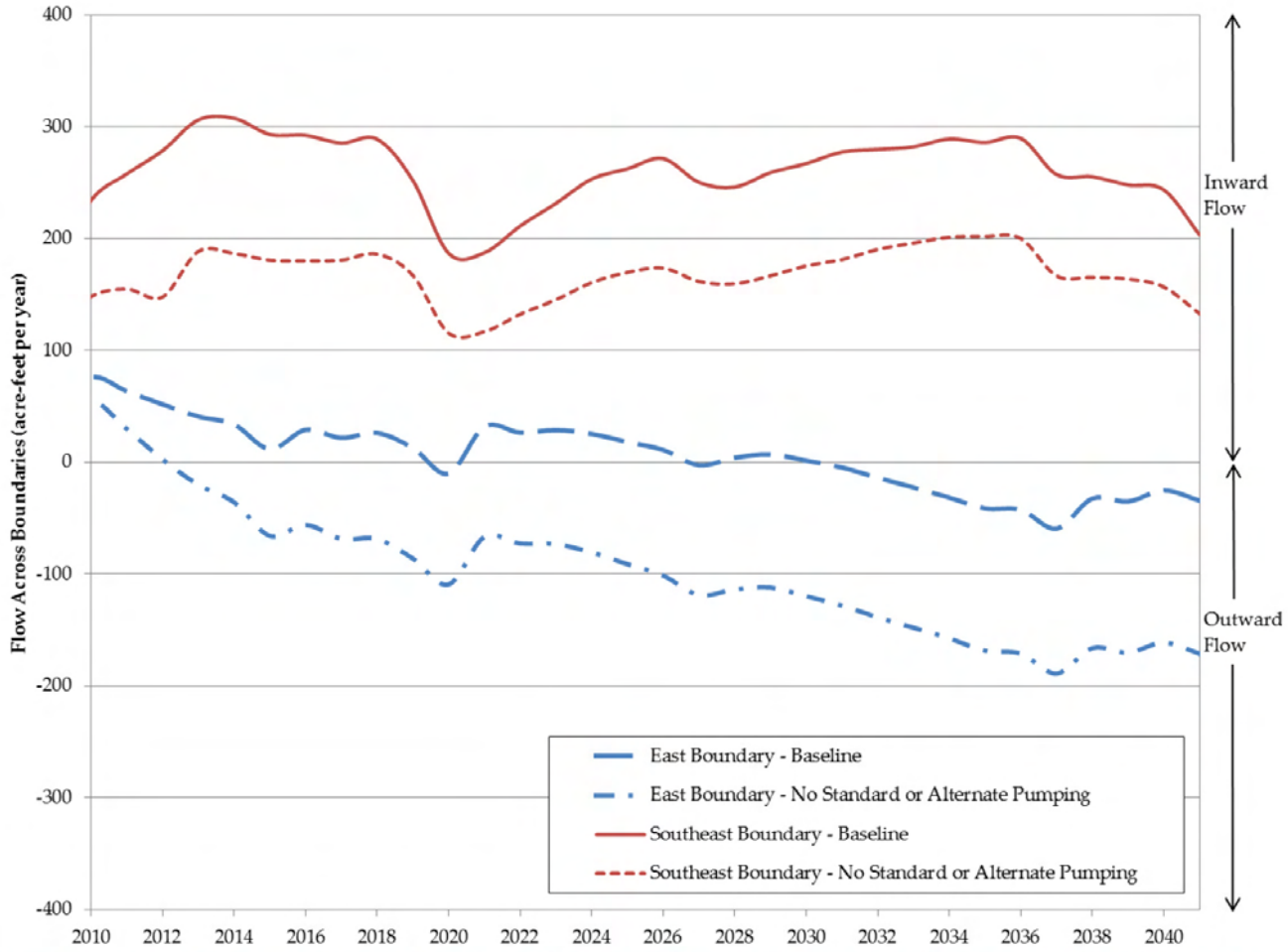


**Figure 20: Flows Across the Laguna Seca East ad Southeast Boundaries under the Baseline and No Standard or Alternative Producer Pumping Scenarios**

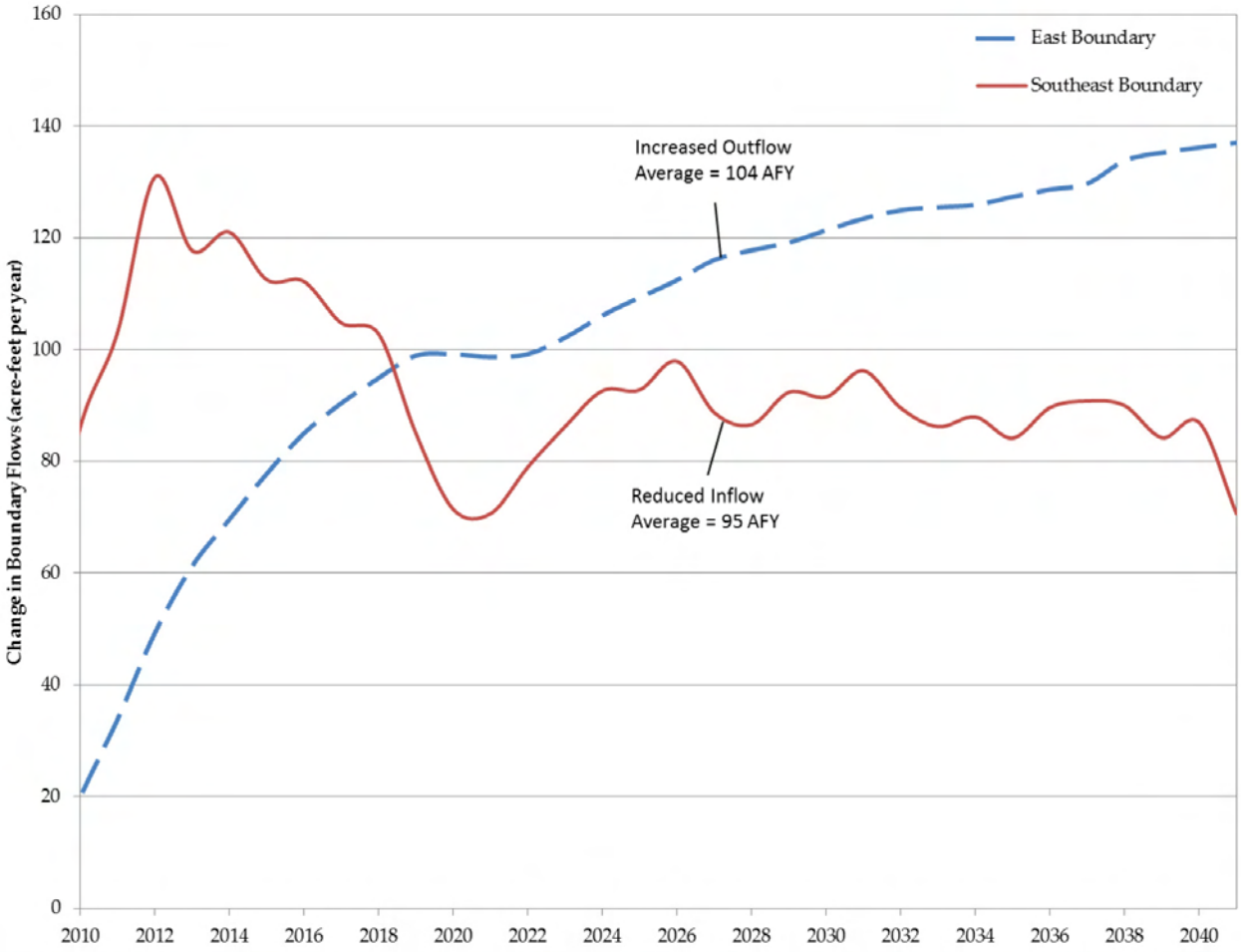


**Figure 21: Changes in Flows Across the Laguna Seca's East and Southeast Boundaries that Result When Pumping is educed from the Baseline to No Standard or Alternative Producer Pumping Scenario**

*HydroMetrics Water Resources, Inc. • 519 17th Street, Suite 500 • Oakland, CA 94612*
*(510) 903-0458 • (510) 903-0468 (fax)*

## CONCLUSIONS

The Seaside Basin groundwater flow model predicts that if Cal-Am discontinues pumping from the Laguna Seca subarea, groundwater elevations in the subarea will continue to decline during the simulation period of 2009-2041. The eastern side of the subarea suffers the greatest and most persistent declines. Pumping groundwater elevations are predicted to fall below the top of the well screen prior to 2041 in wells Bishop #3, Ryan Ranch #7, and Laguna Seca Golf Resort – Racetrack.

An average annual natural safe yield of 240 acre feet per year was calculated for the Laguna Seca subarea. This is considerably lower that the adjudication Decision perennial safe yield of 608 acre feet per year. A scenario with the pumping in Laguna Seca reduced to the natural safe yield of 240 acre feet per year failed to achieve stable groundwater levels.

An attempt was made to estimate the operational safe yield for the subarea using the groundwater flow model. However, it was found that eliminating all pumping from the subarea does not completely halt the predicted decline in groundwater elevations in the easternmost wells: FO-6-Shallow and FO-6 Deep. Consequently, it was not possible to determine an operational safe yield. The presence of nearby pumping wells east of the subarea appears to influence groundwater elevations in the eastern portion of the Laguna Seca subarea.

The unsuccessful attempt to estimate the operational safe yield, and an analysis of flows along the Laguna Seca eastern boundary, suggest that wells outside of the Laguna Seca subarea are preventing the subarea from achieving stable groundwater elevations. This influence could be tested more thoroughly using the groundwater model as follows: Multiple scenarios could be run in which pumping from individual wells outside of the Laguna Seca subarea are either removed or their pumping reduced. The resulting changes to groundwater levels in the Laguna Seca subarea could then be compared to baseline conditions to infer the influence that each well has on the subarea.

# REFERENCES

CH2M Hill, 2004. *Hydrogeologic Assessment of the Seaside Groundwater Basin*. Prepared for Somach, Simmons, & Dunn and California-American Water Co. January, 2004.

Yates, E.B., Feeney, M.B., Rosenberg, L.I., 2002. *Laguna Seca Subarea Phase III Hydrogeologic Update*. Prepared for Monterey Peninsula Water Management District. November, 2002.

## APPENDIX A

### Table A1: Baseline Scenario Annual Natural Safe Yield Components

| Simulated Water Year | Aerial Recharge | Subsurface Inflow | Subsurface Outflow | Natural Safe Yield |
|---|---|---|---|---|
| | Acre-Feet per Year | | | |
| 2009 (Jan-Sep) | 70 | 841 | -1,510 | -598 |
| 2010 | 35 | 1,080 | -1,896 | -782 |
| 2011 | 37 | 1,064 | -1,821 | -720 |
| 2012 | 33 | 1,066 | -1,795 | -696 |
| 2013 | 532 | 1,038 | -1,701 | -131 |
| 2014 | 538 | 1,003 | -1,592 | -51 |
| 2015 | 2,540 | 997 | -1,606 | 1,931 |
| 2016 | 92 | 974 | -1,560 | -494 |
| 2017 | 1,476 | 964 | -1,546 | 894 |
| 2018 | 998 | 962 | -1,509 | 450 |
| 2019 | 2,034 | 942 | -1,549 | 1,427 |
| 2020 | 4,423 | 987 | -1,747 | 3,663 |
| 2021 | 349 | 931 | -1,693 | -414 |
| 2022 | 1,269 | 947 | -1,694 | 522 |
| 2023 | 325 | 946 | -1,656 | -385 |
| 2024 | 356 | 951 | -1,623 | -316 |
| 2025 | 415 | 937 | -1,577 | -225 |
| 2026 | 750 | 938 | -1,549 | 138 |
| 2027 | 1,592 | 925 | -1,559 | 958 |
| 2028 | 937 | 918 | -1,558 | 296 |
| 2029 | 107 | 911 | -1,524 | -507 |
| 2030 | 583 | 906 | -1,498 | -9 |
| 2031 | 79 | 897 | -1,466 | -491 |
| 2032 | 34 | 878 | -1,427 | -515 |
| 2033 | 37 | 858 | -1,377 | -481 |
| 2034 | 33 | 845 | -1,335 | -457 |
| 2035 | 532 | 829 | -1,312 | 48 |
| 2036 | 556 | 825 | -1,296 | 85 |
| 2037 | 2,540 | 837 | -1,379 | 1,997 |
| 2038 | 89 | 822 | -1,358 | -447 |
| 2039 | 1,476 | 828 | -1,386 | 918 |
| 2040 | 1,030 | 832 | -1,400 | 462 |
| 2041 | 2,034 | 824 | -1,470 | 1,388 |
| 2042 (Oct-Dec) | 642 | 197 | -373 | 467 |
| **Average Year** | **866** | **930** | **-1,556** | **240** |

**Table A2: Baseline Scenario Annual Pumping, Change in Storage, and Natural Safe Yield**

| Simulated Water Year | Well Pumping | Change in Storage | Natural Safe Yield |
|---|---|---|---|
| | Acre-Feet per Year | | |
| 2009 (Jan-Sep) | 706 | -1303 | -598 |
| 2010 | 711 | -1493 | -782 |
| 2011 | 713 | -1434 | -720 |
| 2012 | 727 | -1422 | -696 |
| 2013 | 548 | -679 | -131 |
| 2014 | 624 | -675 | -51 |
| 2015 | 569 | 1362 | 1931 |
| 2016 | 565 | -1059 | -494 |
| 2017 | 489 | 405 | 894 |
| 2018 | 532 | -81 | 450 |
| 2019 | 315 | 1113 | 1427 |
| 2020 | 272 | 3391 | 3663 |
| 2021 | 329 | -743 | -414 |
| 2022 | 445 | 77 | 522 |
| 2023 | 513 | -898 | -385 |
| 2024 | 548 | -864 | -316 |
| 2025 | 522 | -748 | -225 |
| 2026 | 587 | -449 | 138 |
| 2027 | 440 | 518 | 958 |
| 2028 | 448 | -152 | 296 |
| 2029 | 503 | -1010 | -507 |
| 2030 | 527 | -537 | -9 |
| 2031 | 546 | -1037 | -491 |
| 2032 | 446 | -962 | -515 |
| 2033 | 458 | -940 | -481 |
| 2034 | 497 | -955 | -457 |
| 2035 | 448 | -401 | 48 |
| 2036 | 526 | -442 | 85 |
| 2037 | 525 | 1473 | 1997 |
| 2038 | 521 | -968 | -447 |
| 2039 | 446 | 472 | 918 |
| 2040 | 531 | -69 | 462 |
| 2041 | 315 | 1074 | 1388 |
| 2042 (Oct-Dec) | 51 | 416 | 467 |
| **Average Year** | **513** | **-273** | **240** |

**Table A2: Baseline Scenario Annual Pumping, Change in Storage, and Natural Safe Yield**

| Simulated Water Year | Well Pumping | Change in Storage | Natural Safe Yield |
|---|---|---|---|
| | Acre-Feet per Year | | |
| 2009 (Jan-Sep) | 706 | -1303 | -598 |
| 2010 | 711 | -1493 | -782 |
| 2011 | 713 | -1434 | -720 |
| 2012 | 727 | -1422 | -696 |
| 2013 | 548 | -679 | -131 |
| 2014 | 624 | -675 | -51 |
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| 2027 | 440 | 518 | 958 |
| 2028 | 448 | -152 | 296 |
| 2029 | 503 | -1010 | -507 |
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| 2038 | 521 | -968 | -447 |
| 2039 | 446 | 472 | 918 |
| 2040 | 531 | -69 | 462 |
| 2041 | 315 | 1074 | 1388 |
| 2042 (Oct-Dec) | 51 | 416 | 467 |
| **Average Year** | **513** | **-273** | **240** |

Table A1 Well Construction Information Provided by MPWMD

| Producer Name | Well Name | WM No. | Township Range Section | DWR Log # | MCHD Permit # | WL Ref Elevation (ft MSL) | Well Depth (feet) | Depth of Screen Top (feet) | Depth of Screen Bottom (feet) | Pump Intake Depth (feet) | Static Water Level (SWL) (feet) | Date SWL (feet) | Pumping Water Level (PWL) (feet) | Date PWL | Pumping Rate (gpm) | Pumping Drawdown (PWL - SWL) (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| California American Water | Bishop #1 | 209 | 16S02E05Ea | NA | NA | 398.81 | 500 | 350 | 490 | 400 | 265.00 | 8/29/13 | 338.00 | 8/27/13 | 282 | 73.00 |
| California American Water | Bishop #3 | 262 | 16S02E05Fd | NA | 10-11766 | 420.58 | 697 | 375 | 685 | NA | 268.00 | 8/27/13 | 379.00 | 8/27/13 | 254 | 111.00 |
| California American Water | Bay Ridge | 226 | 16S02E07Cd | NA | 94-0240 | 545.92 | 800 | 480 | 780 | 470 | 382.90 | 8/27/13 | 432.00 | 8/27/13 | 348 | 49.10 |
| California American Water | Toro #3 | | 16S02E04P01 | NA | NA | NA | 758 | NA | NA | NA | 204.00 | 9/26/13 | *Standby well – currently not operated* | | | NA |
| California American Water | Ryan Ranch #7 | 213 | 15S01E36Nb | 082916 | W-2089 | 294 | 480 | 350 | 470 | 460 | 244.00 | 9/20/13 | 413.00 | 9/20/13 | 65 | 169.00 |
| California American Water | Ryan Ranch #8 | 216 | 16S01E01T54 | 082948 | W-2117 | 306.86 | 450 | 330 | 440 | 300 | 203.00 | 9/26/13 | *Standby well – currently not operated* | | | NA |
| California American Water | Ryan Ranch #11 | 215 | 16S01E01Cd | 804084 | 03-01475 | 307.59 | 455 | 330 | 450 | 420 | 228.00 | 9/20/13 | 229.00 | 9/20/13 | 7 | 1.00 |
| Pasadera Country Club | Main Gate | 208 | 16S02E05Mg | e067374 | 07-11128 | 345.42 | 380 | 230 | 380 | NA | 201.33 | 3/1/13 | 225.75 | 10/1/13 | NA | 24.42 |
| Pasadera Country Club | Paddock | 204 | 16S02E05Mf | 075035 | NA | 352.69 | 498 | 306 | 498 | 259 | 206.83 | 3/1/13 | 216.33 | 10/1/13 | NA | 9.50 |
| Laguna Seca Golf Resort | New #12 | 203 | 16S02E06H_ | 796328 | 03-01188 | 365.96 | 490 | 300 | 480 | 440 | 244.90 | 10/15/13 | 282.5 | 10/17/13 | 380 | 37.60 |
| Laguna Seca Golf Resort | Racetrack | 202 | 16S02E06G50 | 115052 | W3886 | NA | 320 | 290 | 300 | NA | *Currently not operable or serviceable (T. Bryan, 10/17/13)* | | | | | NA |
| York School | York #1 | 212 | 15S01E36Qa | 768995 | 01-349 | 384.30 | 500 | 160 | 480 | NA | 224.44 | 10/1/13 | 286.3 | 7/2/13 | NA | 61.86 |
| Laguna Seca Recreation Area | LSRA #1 | 197 | 16S02E05Ge | NA | NA | 392.72 | 690 | NA | NA | NA | 200.82 | 10/15/13 | 288.4 | 10/16/13 | 190 | 87.58 |
| Laguna Seca Recreation Area | LSRA #2 | 196 | 16S02E05G( | 786672 | 02-051 | 390.90 | 650 | 330 | 630 | NA | 180.30 | 10/15/13 | *Not working (M. Pierce, 10/16/13)* | | | NA |

## *SEASIDE BASIN WATER MASTER*
## *TECHNICAL ADVISORY COMMITTEE*

### ** * * AGENDA TRANSMITTAL FORM * * **

| | |
|---|---|
| **MEETING DATE:** | January 8, 2014 |
| **AGENDA ITEM:** | 5 |
| **AGENDA TITLE:** | Schedule |
| **PREPARED BY:** | Robert Jaques, Technical Program Manager |

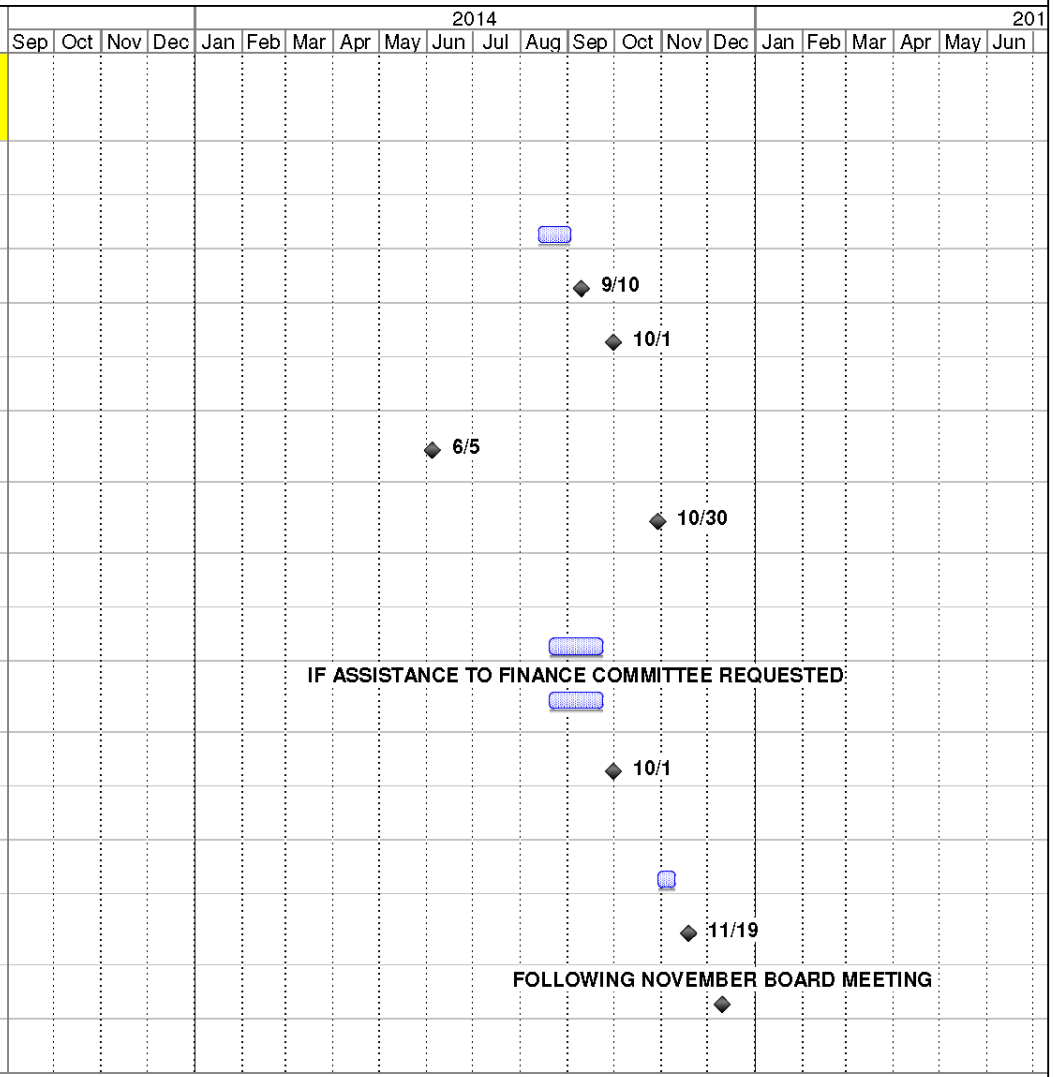
**SUMMARY:**

As a regular part of each monthly TAC meeting, I will provide the TAC with an updated Schedule of the activities being performed by the Watermaster, its consultants, and the public entity, MPWMD, which is performing certain portions of the work.

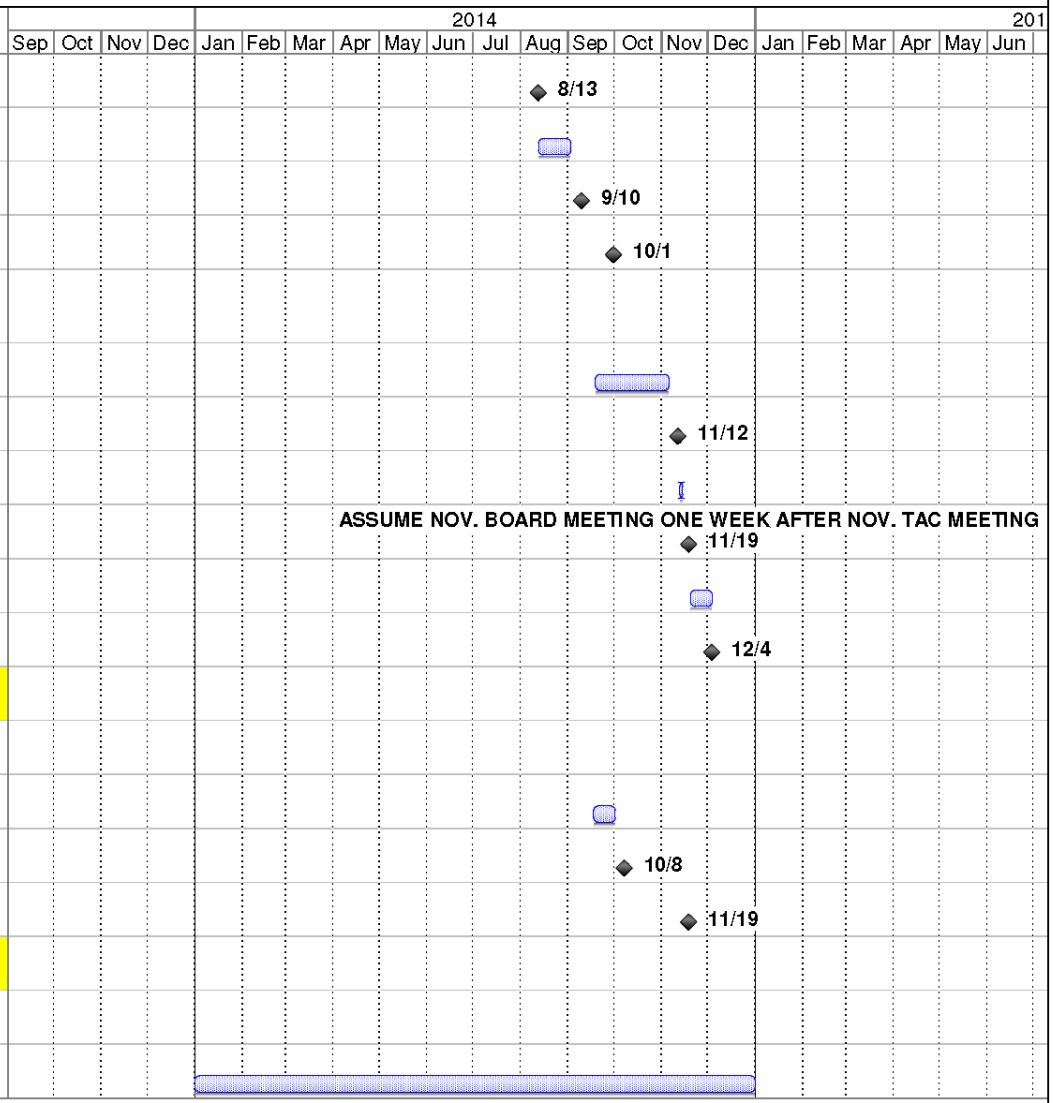
Attached is the most recent update of the Work Schedule for FY 2014.

| | |
|---|---|
| **ATTACHMENTS:** | Schedule of Work Activities for FY 2014 |
| **RECOMMENDED ACTION:** | Provide Input to Technical Program Manager Regarding Any Corrections or Additions to these Schedules |

# Seaside Basin Watermaster
# Monitoring and Management Program
# 2014 Work Schedule

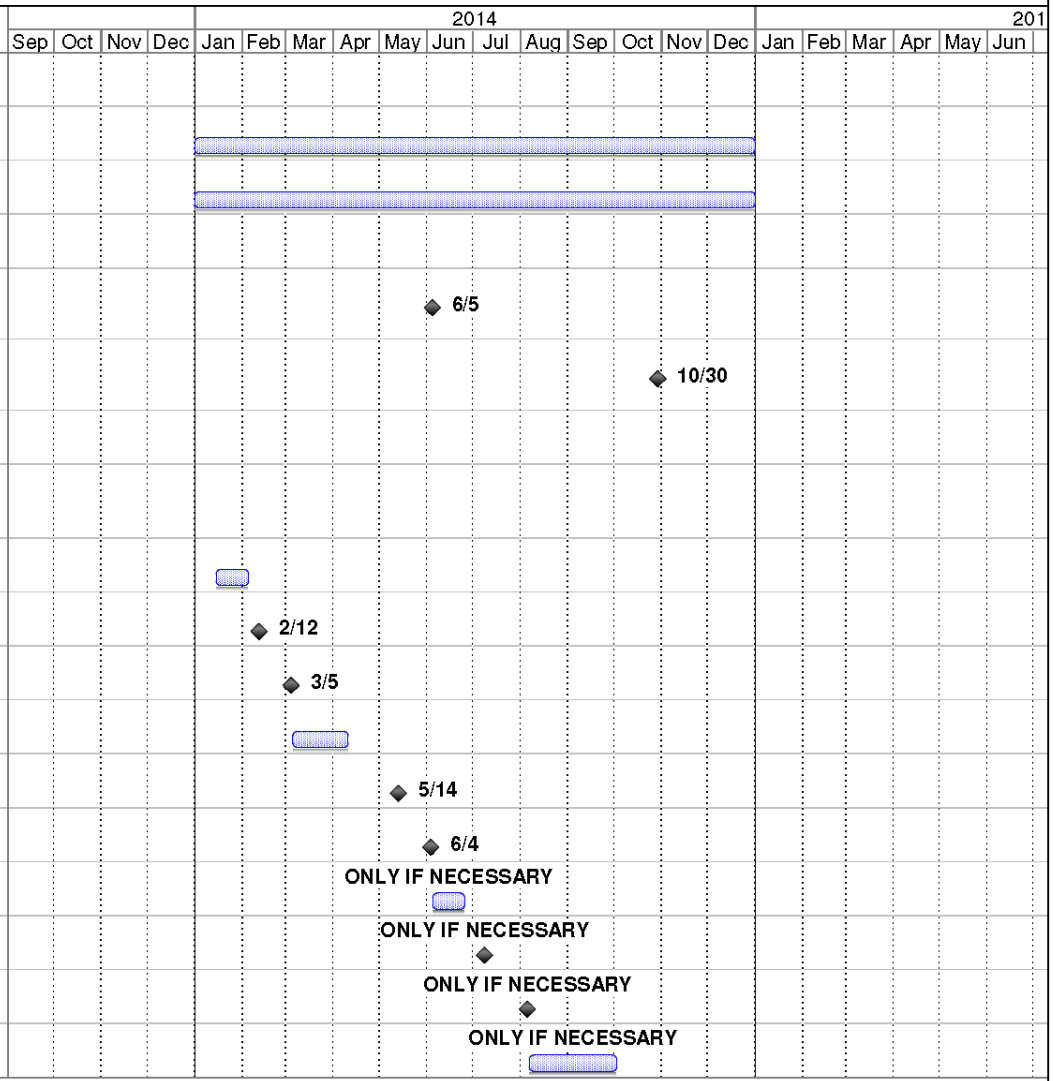


# Seaside Basin Watermaster
# Monitoring and Management Program
# 2014 Work Schedule




| ID | Task Name |
|---|---|
| 18 | Preliminary Discussion of Potential Scope of Work for 2015 M&MP |
| 19 | Prepare Draft 2014 and 2015 M&MP O&M and Capital Budgets |
| 20 | TAC approves Draft 2015 and 2016 M&MP O&M and Capital Budgets |
| 21 | Board approves 2015 and 2016 M&MP O&M and Capital Budgets |
| 22 | **2013 Annual Report (Note: Schedule Reflects Court Approval of Later Submittal Date for Annual Report)** |
| 23 | Prepare Preliminary Draft 2014 Annual Report |
| 24 | TAC Provides Input on Draft 2014 Annual Report |
| 25 | Prepare Revised Draft 2014 Annual Report (Incorporating TAC Input) |
| 26 | Board Provides Input on Revised Draft 2014 Annual Report (At November Board Meeting) |
| 27 | Prepare Final 2014 Annual Report (Incorporating Board Input) |
| 28 | Watermaster Submits Final 2014 Annual Report to Judge |
| 29 | ***MANAGEMENT*** |
| 30 | **M.1 PROGRAM ADMINISTRATION (All Work Performed by Watermaster Staff)** |
| 31 | Prepare Initial Consultant Contracts for 2015 |
| 32 | TAC Approval of Initial Consultant Contracts for 2015 |
| 33 | Board Approval of Initial Consultant Contracts for 2015 (At November Board Meeting) |
| 34 | ***IMPLEMENTATION*** |
| 35 | **I.2.a DATABASE MANAGEMENT** |
| 36 | **I.2.a.1 Conduct Ongoing Data Entry/Database Maintenance** |

# Seaside Basin Watermaster
# Monitoring and Management Program
# 2014 Work Schedule




| ID | Task Name |
|---|---|
| 37 | **I.2.b DATA COLLECTION PROGRAM** |
| 38 | **I.2.b.2 Collect Monthly Water Levels (MPWMD)** |
| 39 | **I.2.b.3 Collect Quarterly Water Quality Samples (MPWMD)** |
| 40 | **I.2.b.6 Reports (from MPWMD)** |
| 41 | Watermaster Prepares Combined Quarterly Water Production, Water Level, and Water Quality Reports for 1st & 2nd Quarters |
| 42 | Watermaster Prepares Annual Water Production, Water Level, and Water Quality Report for 2014 |
| 43 | **I.3.a ENHANCED SEASIDE BASIN GROUNDWATER MODEL** |
| 44 | **I.3.a.1 Update (and Potentially Recalibrate) Existing Groundwater Model** |
| 45 | Prepare RFS for HydroMetrics to Update Model and Check Accuracy |
| 46 | TAC Approves RFS to HydroMetrics |
| 47 | Board Approves RFS to HydroMetrics |
| 48 | HydroMetrics Updates Model and Checks Accuracy |
| 49 | HydroMetrics Presents Draft Model Update Report to TAC |
| 50 | HydroMetrics Presents Model Update Report to Board |
| 51 | Prepare RFS for HydroMetrics to Recalibrate Model |
| 52 | TAC Approves RFS to HydroMetrics |
| 53 | Board Approves RFS to HydroMetrics |
| 54 | HydroMetrics Recalibrates Model |

# Seaside Basin Watermaster
# Monitoring and Management Program
# 2014 Work Schedule

| ID | Task Name | 2014 | | | | | | | | | | | | | | | | 201 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun |
| 55 | HydroMetrics Presents Draft Model Recalibration Report to TAC | | | | | | | | | | | | ONLY IF NECESSARY | | | | | | | | | | |
| 56 | HydroMetrics Presents Model Recalibration Report to Board | | | | | | | | | | | | | ONLY IF NECESSARY | | | | | | | | | |
| 57 | **I.3.c Refine and/or Update the BMAP** | | NO WORK SCHEDULED UNTIL TAC DIRECTION PROVIDED TO RESUME DISCUSSION | | | | | | | | | | | | | | | | | | | | |
| 58 | **I.4.c Annual Seawater Intrusion Analysis Report (SIAR)** | | | | | | | | | | | | | | | | | | | | | | |
| 59 | HydroMetrics Provides Draft SIAR to Watermaster | | | | | | | | | | | | | | | 11/6 | | | | | | | |
| 60 | TAC Approves Annual Seawater Intrusion Analysis Report (SIAR) | | | | | | | | | | | | | | | 11/12 | | | | | | | |
| 61 | Board Approves Annual Seawater Intrusion Analysis Report (SIAR) | | | | | | | | | | | | | | | 11/19 | | | | | | | |
| 62 | **I.4.d Complete Preparation of Seawater Intrusion Response Plan (SIRP)** | | | | | WORK COMPLETED - NO FURTHER WORK PLANNED IN 2014 | | | | | | | | | | | | | | | | | |
| 63 | **I.4.e Refine and/or Update the SIRP** | | | | | | NOT NECESSARY | | | | | | | | | | | | | | | | |

## *SEASIDE BASIN WATER MASTER*
## *TECHNICAL ADVISORY COMMITTEE*

### ** * * AGENDA TRANSMITTAL FORM * * **

| | |
|---|---|
| **MEETING DATE:** | January 8, 2014 |
| **AGENDA ITEM:** | 6 |
| **AGENDA TITLE:** | Other Business |
| **PREPARED BY:** | Robert Jaques, Technical Program Manager |

**SUMMARY:**
The "Other Business" agenda item is intended to provide an opportunity for TAC members or others present at the meeting to discuss items not on the agenda that may be of interest to the TAC.

| | |
|---|---|
| **ATTACHMENTS:** | None |
| **RECOMMENDED ACTION:** | None required – information only |